HANDBOOK FOR

BRUNNER & SUDDARTH'S

Textbook of Medical-Surgical Nursing

TWELFTH EDITION

Wolters Kluwer Health | Lippincott Williams & Wilkins

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Preface

This *Handbook for Brunner & Suddarth's Textbook of Medical-Surgical Nursing*, 12th edition, is a comprehensive yet concise clinical reference designed for use by nursing students and professionals. Perfect for use across multiple health care settings, the *Handbook* presents need-to-know information on nearly 200 commonly encountered diseases and disorders. The easy-to-use, colorful, consistent, and alphabetized outline format enables readers to gain quick access to vital information on

- Disease (Pathophysiology)
- Clinical Manifestations
- Assessment and Diagnostic Methods
- Medical, Surgical, and Pharmacologic Management
- Nursing Management according to the Nursing Process

For readers requiring more in-depth information, the *Handbook* is completely cross-referenced to chapters in *Brunner & Suddarth's Textbook of Medical-Surgical Nursing*, 12th edition.

Special Features

The *Handbook* places special emphasis on home- and community-based nursing practice, patient education, and expected outcomes of care. Additional features include the following:

Gerontologic Considerations—Thumbnail descriptions and interventions related to the care of the older adult population, whose health care needs continue to expand at a rapid rate.

Nursing Alerts—Instant notes focused on priority care issues and hazardous or potentially life-threatening situations.

Selected **tables and boxes**—At-a-glance presentations of additional diseases, disorders, measurements, and the like.

Up-to-date **appendices** for use in clinicals, on the unit, and at home or in the community. These include the following:

- Important lab values
- Current nursing diagnoses
- Acronyms and abbreviations

Contents

R

S

T

U

V



A

Acquired Immunodeficiency Syndrome (HIV Infection)

Acquired immunodeficiency syndrome (AIDS) is defined as the most severe form of a continuum of illnesses associated with human immunodeficiency virus (HIV) infection. HIV belongs to a group of viruses known as retroviruses. These viruses carry their genetic material in the form of ribonucleic acid (RNA) rather than deoxyribonucleic acid (DNA). Infection with HIV occurs when it enters the host CD4 (T) cell and causes this cell to replicate viral RNA and viral proteins, which in turn invade other CD4 cells.

The stage of HIV disease is based on clinical history, physical examination, laboratory evidence of immune dysfunction, signs and symptoms, and infections and malignancies. The Centers for Disease Control and Prevention (CDC) standard case definition of AIDS categorizes HIV infection and AIDS in adults and adolescents on the basis of clinical conditions associated with HIV infection and CD4+ T-cell counts. Four categories of infected states have been denoted:

- Primary infection (acute/recent HIV infection, acute HIV syndrome: dramatic drops in CD4 T-cell counts, which are normally between 500 and 1,500 cells/mm^3)
- HIV asymptomatic (CDC Category A: more than 500 CD4+ T lymphocytes/mm^3)
- HIV symptomatic (CDC Category B: 200 to 499 CD4+ T lymphocytes/mm^3)
- AIDS (CDC Category C: fewer than 200 CD4+ T lymphocytes/mm^3)

Risk Factors

HIV is transmitted through bodily fluids by high-risk behaviors such as heterosexual intercourse with an HIV-infected

partner, injection drug use, and male homosexual relations. People who received transfusions of blood or blood products contaminated with HIV, children born to mothers with HIV infection, breast-fed infants of HIV-infected mothers, and health care workers exposed to needle-stick injury associated with an infected patient are also at risk.

Clinical Manifestations

Symptoms are widespread and may affect any organ system. Manifestations range from mild abnormalities in immune response without overt signs and symptoms to profound immunosuppression, life-threatening infection, malignancy, and the direct effect of HIV on body tissues.

Respiratory

- Shortness of breath, dyspnea, cough, chest pain, and fever are associated with opportunistic infections, such as those caused by *Pneumocystis jiroveci* (*Pneumocystis* pneumonia [PCP], the most common infection), *Mycobacterium avium-intracellulare*, cytomegalovirus (CMV), and *Legionella* species.
- HIV-associated tuberculosis occurs early in the course of HIV infection, often preceding a diagnosis of AIDS.

Gastrointestinal

- Loss of appetite
- Nausea and vomiting
- Oral and esophageal candidiasis (white patches, painful swallowing, retrosternal pain, and possibly oral lesions)
- Chronic diarrhea, possibly with devastating effects (eg, profound weight loss, fluid and electrolyte imbalances, perianal skin excoriation, weakness, and inability to perform activities of daily living)

Wasting Syndrome (Cachexia)

- Multifactorial protein-energy malnutrition
- Profound involuntary weight loss exceeding 10% of baseline body weight
- Either chronic diarrhea (for more than 30 days) or chronic weakness and documented intermittent or constant fever with no concurrent illness

- Anorexia, diarrhea, gastrointestinal (GI) malabsorption, lack of nutrition, and for some patients a hypermetabolic state

Oncologic

Certain types of cancer occur often in people with AIDS and are considered AIDS-defining conditions:

- Kaposi's sarcoma (KS) is the most common HIV-related malignancy and involves the endothelial layer of blood and lymphatic vessels (exhibits a variable and aggressive course, ranging from localized cutaneous lesions to disseminated disease involving multiple organ systems).
- B-cell lymphomas are the second most common malignancy; they tend to develop outside the lymph nodes, most commonly in the brain, bone marrow, and GI tract. These types of lymphomas are characteristically of a higher grade, indicating aggressive growth and resistance to treatment.
- Invasive cervical cancer.

Neurologic

HIV-associated neurocognitive disorders consist of cognitive impairment that is often accompanied by motor dysfunction and behavioral change.

- HIV-related peripheral neuropathy is common across the trajectory of HIV infection and may occur in a variety of patterns, with distal sensory polyneuropathy (DSPN) or distal symmetrical polyneuropathy the most frequently occurring type. DSPN can lead to significant pain and decreased function.
- HIV encephalopathy (formerly referred to as AIDS dementia complex [ADC]) is a clinical syndrome that is characterized by a progressive decline in cognitive, behavioral, and motor functions. Symptoms include memory deficits, headache, difficulty concentrating, progressive confusion, psychomotor slowing, apathy, and ataxia, and in later stages global cognitive impairments, delayed verbal responses, a vacant stare, spastic paraparesis, hyperreflexia, psychosis, hallucinations, tremor, incontinence, seizures, mutism, and death.
- *Cryptococcus neoformans*, a fungal infection (fever, headache, malaise, stiff neck, nausea, vomiting, mental status changes, and seizures).

- Progressive multifocal leukoencephalopathy (PML), a central nervous system demyelinating disorder (mental confusion, blindness, aphasia, muscle weakness, paresis, and death).
- Other common infections involving the nervous system include *Toxoplasma gondii*, CMV, and *Mycobacterium tuberculosis* infections.
- Central and peripheral neuropathies, including vascular myelopathy (spastic paraparesis, ataxia, and incontinence).

Depressive

- Causes of depression are multifactorial and may include a history of preexisting mental illness, neuropsychiatric disturbances, psychosocial factors, or response to the physical symptoms.
- People with HIV/AIDS who are depressed may experience irrational guilt and shame, loss of self-esteem, feelings of helplessness and worthlessness, and suicidal ideation.

Integumentary

- KS, herpes simplex, and herpes zoster viruses and various forms of dermatitis associated with painful vesicles
- Folliculitis, associated with dry flaking skin or atopic dermatitis (eczema or psoriasis)

Gynecologic

- Persistent recurrent vaginal candidiasis may be the first sign of HIV infection.
- Ulcerative sexually transmitted diseases, such as chancroid, syphilis, and herpes, are more severe in women with HIV.
- Human papillomavirus causes venereal warts and is a risk factor for cervical intraepithelial neoplasia, a cellular change that is frequently a precursor to cervical cancer.
- Women with HIV are 10 times more likely to develop cervical intraepithelial neoplasia.
- Women with HIV have a higher incidence of pelvic inflammatory disease (PID) and menstrual abnormalities (amenorrhea or bleeding between periods).

Assessment and Diagnostic Methods

Confirmation of HIV antibodies is done using enzyme immunoassay (EIA; formerly enzyme-linked immunosorbent assay [ELISA]), Western blot assay, and viral load tests such as

target amplification methods. In addition to this HIV-1 antibody assay, two additional techniques are now available: the OraSure saliva test and the OraQuick Rapid HIV-1 antibody test.

Medical Management

Treatment of Opportunistic Infections

Guidelines for the treatment of opportunistic infections should be consulted for the most current recommendations. Immune function should improve with initiation of highly active antiretroviral therapy (HAART), resulting in faster resolution of the opportunistic infection.

Pneumocystis Pneumonia

- Trimethoprim-sulfamethoxazole (TMP-SMZ) is the treatment of choice for PCP; adjunctive corticosteroids should be started as early as possible (and certainly within 72 hours).
- Alternative therapeutic regimens (mild-to-moderate) include (1) dapsone and TMP; (2) primaquine plus clindamycin; and (3) atovaquone suspension.
- Alternative therapeutic regimens (moderate-to-severe) include (1) primaquine plus clindamycin or (2) intravenous (IV) pentamidine.
- Adverse effects include hypotension, impaired glucose metabolism leading to the development of diabetes mellitus from damage to the pancreas, renal damage, hepatic dysfunction, and neutropenia.

Mycobacterium Avium Complex

- HIV-infected adults and adolescents should receive chemoprophylaxis against disseminated *Mycobacterium avium* complex (MAC) disease if they have a CD4+ count fewer than 50 cells/μL.
- Azithromycin (Zithromax) and clarithromycin (Biaxin) are the preferred prophylactic agents.
- Rifabutin is an alternative prophylactic agent, although drug interactions may make this agent difficult to use.

Cryptococcal Meningitis

- Current primary therapy for cryptococcal meningitis is IV amphotericin B with or without oral flucytosine (5-FC, Ancobon) or fluconazole (Diflucan).

- Serious potential adverse effects of amphotericin B include anaphylaxis, renal and hepatic impairment, electrolyte imbalances, anemia, fever, and severe chills.

CMV Retinitis

- Oral valganciclovir, IV ganciclovir, IV ganciclovir followed by oral valganciclovir, IV foscarnet, IV cidofovir, and the ganciclovir intraocular implant coupled with valganciclovir are all effective treatments for CMV retinitis.
- A common adverse reaction to ganciclovir is severe neutropenia, which limits the concomitant use of zidovudine (azidothymidine [AZT], Compound S, Retrovir).
- Common adverse reactions to foscarnet are nephrotoxicity, including acute renal failure, and electrolyte imbalances, including hypocalcemia, hyperphosphatemia, and hypomagnesemia, which can be life threatening.
- Other common adverse effects include seizures, GI tract disturbances, anemia, phlebitis at the infusion site, and low back pain.
- Possible bone marrow suppression (producing a decrease in white blood cell [WBC] and platelet counts), oral candidiasis, and liver and renal impairments require close monitoring.

Other Infections

Oral acyclovir, famciclovir, or valacyclovir may be used to treat infections caused by herpes simplex or herpes zoster. Esophageal or oral candidiasis is treated topically with clotrimazole (Mycelex) oral troches or nystatin suspension. Chronic refractory infection with candidiasis (thrush) or esophageal involvement is treated with ketoconazole (Nizoral) or fluconazole(Diflucan).

Prevention of Opportunistic Infections

- People with HIV infection who have a T-cell count of fewer than 200 cells/mm^3 should receive chemoprophylaxis with TMP-SMZ to prevent PCP.
- PCP prophylaxis can be safely discontinued in patients who are responding to HAART with a sustained increase in T lymphocytes.

Antidiarrheal Therapy

Therapy with octreotide acetate (Sandostatin), a synthetic analog of somatostatin, has been shown to be effective in managing chronic severe diarrhea.

Chemotherapy

Kaposi's Sarcoma

- Treatment goals are to reduce symptoms by decreasing the size of the skin lesions, to reduce discomfort associated with edema and ulcerations, and to control symptoms associated with mucosal or visceral involvement.
- Radiation therapy is effective as a palliative measure; alpha-interferon can lead to tumor regression and improved immune system function.

Lymphoma

Successful treatment of AIDS-related lymphomas has been limited because of the rapid progression of these malignancies. Combination chemotherapy and radiation therapy regimens may produce an initial response, but it is usually short-lived.

Antidepressant Therapy

- Treatment of depression involves psychotherapy integrated with pharmacotherapy (antidepressants [eg, imipramine, desipramine, and fluoxetine] and possibly a psychostimulant [eg, methylphenidate]).
- Electroconvulsive therapy may be an option for patients with severe depression who do not respond to pharmacologic interventions.

Nutrition Therapy

A healthy diet tailored to meet the nutritional needs of the patient is important.

- Patients with diarrhea should consume a diet low in fat, lactose, insoluble fiber, and caffeine and high in soluble fiber.
- Calorie counts should be obtained to evaluate nutritional status and initiate appropriate therapy for patients experiencing unexplained weight loss.
- Appetite stimulants can be used in patients with AIDS-related anorexia.

- Oral supplements may be used to supplement diets that are deficient in calories and protein.

NURSING PROCESS

The Patient with HIV/AIDS

Assessment

Identify potential risk factors, including sexual practices and IV/injection drug use history. Assess physical and psychological status. Thoroughly explore factors affecting immune system functioning.

Nutritional Status

- Obtain dietary history.
- Identify factors that may interfere with oral intake, such as anorexia, nausea, vomiting, oral pain, or difficulty swallowing.
- Assess patient's ability to purchase and prepare food.
- Measure nutritional status by weight, anthropometric measurements (triceps skinfold measurement), and blood urea nitrogen (BUN), serum protein, albumin, and transferrin levels.

Skin and Mucous Membranes

- Inspect daily for breakdown, ulceration, and infection.
- Monitor oral cavity for redness, ulcerations, and creamy-white patches (candidiasis).
- Assess perianal area for excoriation and infection.
- Obtain wound cultures to identify infectious organisms.

Respiratory Status

- Monitor for cough, sputum production, shortness of breath, orthopnea, tachypnea, and chest pain; assess breath sounds.
- Assess other parameters of pulmonary function (chest x-rays, arterial blood gases [ABGs], pulse oximetry, pulmonary function tests).

Neurologic Status

- Assess mental status as early as possible to provide a baseline. Note level of consciousness and orientation to

person, place, and time and the occurrence of memory lapses.
- Observe for sensory deficits, such as visual changes, headache, and numbness and tingling in the extremities.
- Observe for motor impairments, such as altered gait and paresis.
- Observe for seizure activity.

Fluid and Electrolyte Status
- Examine skin and mucous membranes for turgor and dryness.
- Assess for dehydration by observing for increased thirst, decreased urine output, low blood pressure, weak rapid pulse, or urine's specific gravity.
- Monitor electrolyte imbalances. (Laboratory studies show low serum sodium, potassium, calcium, magnesium, and chloride levels.)
- Assess for signs and symptoms of electrolyte deficits, including altered mental status, muscle twitching, muscle cramps, irregular pulse, nausea and vomiting, and shallow respirations.

Level of Knowledge
- Evaluate patient's knowledge of disease and transmission.
- Assess level of knowledge of family and friends.
- Explore patient's reaction to the diagnosis of HIV infection or AIDS.
- Explore how patient has dealt with illness and major life stressors in the past.
- Identify patient's resources for support.

Use of Alternative Therapies
- Question patient about the use of alternative therapies.
- Encourage patient to report any use of alternative therapies to primary health care provider.
- Become familiar with potential side effects of alternative therapies; if side effect is suspected to result from alternative therapies, discuss with patient and primary and alternative health care providers.
- View alternative therapies with an open mind, and try to understand the importance of the treatment to patient.

Diagnosis

Nursing Diagnoses

- Impaired skin integrity related to cutaneous manifestations of HIV infection, excoriation, and diarrhea
- Diarrhea related to enteric pathogens or HIV infection
- Risk for infection related to immunodeficiency
- Activity intolerance related to weakness, fatigue, malnutrition, impaired fluid and electrolyte balance, and hypoxia associated with pulmonary infections
- Disturbed thought processes related to shortened attention span, impaired memory, confusion, and disorientation associated with HIV encephalopathy
- Ineffective airway clearance related to PCP, increased bronchial secretions, and decreased ability to cough related to weakness and fatigue
- Pain related to impaired perianal skin integrity secondary to diarrhea, KS, and peripheral neuropathy
- Imbalanced nutrition, less than body requirements, related to decreased oral intake
- Social isolation related to stigma of the disease, withdrawal of support systems, isolation procedures, and fear of infecting others
- Anticipatory grieving related to changes in lifestyle and roles and unfavorable prognosis
- Deficient knowledge related to HIV infection, means of preventing HIV transmission, and self-care

Collaborative Problems/Potential Complications

- Opportunistic infections
- Impaired breathing or respiratory failure
- Wasting syndrome and fluid and electrolyte imbalance
- Adverse reaction to medications

Planning and Goals

Goals for the patient may include achievement and maintenance of skin integrity, resumption of usual bowel patterns, absence of infection, improved activity tolerance, improved thought processes, improved airway clearance, increased comfort, improved nutritional status, increased socialization, expression of grief, increased knowledge

regarding disease prevention and self-care, and absence of complications.

Nursing Interventions

Promoting Skin Integrity

- Assess skin and oral mucosa for changes in appearance, location and size of lesions, and evidence of infection and breakdown; encourage regular oral care.
- Encourage patient to balance rest and mobility whenever possible; assist immobile patients to change position every 2 hours.
- Use devices such as alternating-pressure mattresses and low-air-loss beds.
- Encourage patient to avoid scratching, to use nonabrasive and nondrying soaps, and to use nonperfumed skin moisturizers on dry skin; administer antipruritic agents, antibiotic medication, analgesic agents, medicated lotions, ointments, and dressings as prescribed; avoid excessive use of tape.
- Keep bed linen free of wrinkles, and avoid tight or restrictive clothing to reduce friction to skin.
- Advise patient with foot lesions to wear white cotton socks and shoes that do not cause feet to perspire.

Maintaining Perianal Skin Integrity

- Assess perianal region for impaired skin integrity and infection.
- Instruct patient to keep the area as clean as possible, to cleanse after each bowel movement, to use sitz bath or irrigation, and to dry the area thoroughly after cleaning.
- Assist debilitated patient in maintaining hygiene practices.
- Promote healing with prescribed topical ointments and lotions.
- Culture wounds if infection is suspected.

Promoting Usual Bowel Patterns

- Assess bowel patterns for diarrhea (frequency and consistency of stool, pain or cramping with bowel movements).
- Assess factors that increase frequency of diarrhea.
- Measure and document volume of liquid stool as fluid volume loss; obtain stool cultures.

- Counsel patient about ways to decrease diarrhea (rest bowel, avoid foods that act as bowel irritants, including raw fruits and vegetables); encourage small, frequent meals.
- Administer prescribed medications, such as anticholinergic antispasmodic medications or opiates, antibiotic medications, and antifungal agents.
- Assess self-care strategies patient uses to control diarrhea.

Preventing Infection

- Instruct patient and caregivers to monitor for signs and symptoms of infection. Recommend strategies to avoid infection (upper respiratory tract infections).
- Monitor laboratory values that indicate the presence of infection, such as WBC count and differential; assist in obtaining culture specimens as ordered.
- Strongly urge patients and sexual partners to avoid exposure to body fluids and to use condoms for any sexual activities.
- Strongly discourage IV/injection drug use because of risk of other infections and transmission of HIV infection to the patient.
- Maintain strict aseptic technique for invasive procedures.

NURSING ALERT

Observe universal precautions in all patient care. Teach colleagues and other health care workers to apply precautions to blood and all body fluids, secretions, and excretions except sweat (eg, cerebrospinal fluid; synovial, pleural, peritoneal, pericardial, amniotic, and vaginal fluids; semen). Consider all body fluids to be potentially hazardous in emergency circumstances when differentiating between fluid types is difficult.

Improving Activity Tolerance

- Monitor ability to ambulate and perform daily activities.
- Assist in planning daily routines to maintain balance between activity and rest.
- Instruct patient in energy conservation techniques (eg, sitting while washing or preparing a meal).
- Decrease anxiety that contributes to weakness and fatigue by using measures such as relaxation and guided imagery.

- Collaborate with other health care team members to uncover and address factors associated with fatigue (eg, epoetin alfa [Epogen] for fatigue related to anemia).

Maintaining Thought Processes

- Assess for alterations in mental status.
- Reorient to person, place, and time as necessary; maintain and post a regular daily schedule.
- Give instructions, and instruct family to speak to patient, in a slow, simple, and clear manner.
- Provide night lights for bedroom and bathroom. Plan safe leisure activities that patient previously enjoyed.

NURSING ALERT

Provide around-the-clock supervision as necessary for patients with HIV encephalopathy.

Improving Airway Clearance

- At least daily, assess respiratory status, mental status, and skin color.
- Note and document presence of cough and quantity and characteristics of sputum; send specimen for analysis as ordered.
- Provide pulmonary therapy, such as coughing, deep breathing, postural drainage, percussion, and vibration, every 2 hours to prevent stasis of secretions and promote airway clearance.
- Assist patient into a position (high- or semi-Fowler's) that facilitates breathing and airway clearance.
- Encourage adequate rest to minimize energy expenditure and prevent fatigue.
- Evaluate fluid volume status; encourage intake of 3 L daily.
- Provide humidified oxygen, suctioning, intubation, and mechanical ventilation as necessary.

Relieving Pain and Discomfort

- Assess patient for quality and severity of pain associated with impaired perianal skin integrity, KS lesions, and peripheral neuropathy.

- Explore effects of pain on elimination, nutrition, sleep, affect, and communication, along with exacerbating and relieving factors.
- Encourage patient to use soft cushions or foam pads while sitting and topical anesthetics or ointments as prescribed.
- Instruct patient to avoid irritating foods and to use antispasmodic agents and antidiarrheal preparations if necessary.
- Administer nonsteroidal anti-inflammatory agents and opiates, and use nonpharmacologic approaches, such as relaxation techniques.
- Administer opioids and tricyclic antidepressants, and recommend graduated compression stockings as prescribed to help alleviate neuropathic pain.

Improving Nutritional Status

- Assess weight, dietary intake, anthropometric measurements, and serum albumin, BUN, protein, and transferrin levels.
- Based on assessment of factors interfering with oral intake, implement specific measures to facilitate oral intake; consult dietitian to determine nutritional requirements.
- Control nausea and vomiting; encourage patient to eat easy-to-swallow foods; encourage oral hygiene before and after meals.
- Encourage rest before meals; do not schedule meals after painful or unpleasant procedures.
- Instruct patient about ways to supplement nutritional value of meals (eg, add eggs, butter, milk).
- Provide enteral or parenteral feedings to maintain nutritional status, as indicated.

Decreasing Sense of Social Isolation

- Provide an atmosphere of acceptance and understanding of AIDS patients, their families, and partners.
- Assess patient's usual level of social interaction early to provide a baseline for monitoring changes in behavior.
- Encourage patient to express feelings of isolation and aloneness; assure patient that these feelings are not unique or abnormal.

- Assure patients, family, and friends that AIDS is not spread through casual contact.

Coping With Grief

- Help patients explore and identify resources for support and mechanisms for coping.
- Encourage patient to maintain contact with family, friends, and coworkers and to continue usual activities whenever possible.
- Encourage patient to use local or national AIDS support groups and hotlines and to identify losses and deal with them when possible.

Monitoring and Managing Potential Complications

- Inform patient that signs and symptoms of opportunistic infections include fever, malaise, difficulty breathing, nausea or vomiting, diarrhea, difficulty swallowing, and any occurrences of swelling or discharge. These symptoms should be reported to the health care provider immediately.
- Respiratory failure and impaired breathing: monitor ABG values, oxygen saturation, respiratory rate and pattern, and breath sounds; provide suctioning and oxygen therapy; assist patient on mechanical ventilation to cope with associated stress.
- Wasting syndrome and fluid and electrolyte disturbances: monitor weight gain or loss, skin turgor and dryness, ferritin levels, hemoglobin and hematocrit, and electrolytes. Assist in selecting foods that replenish electrolytes. Initiate measures to control diarrhea. Provide IV fluids and electrolytes as prescribed.
- Side effects of medications: provide information about purpose, administration, side effects (those reportable to physician), and strategies to manage or prevent side effects of medications. Monitor laboratory test values.

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE

- Thoroughly discuss the disease and all fears and misconceptions; instruct patient, family, and friends about the transmission of AIDS.

- Discuss precautions to prevent transmission of HIV: use of condoms during vaginal or anal intercourse; using dental dam or avoiding oral contact with the penis, vagina, or rectum; avoiding sexual practices that might cut or tear the lining of the rectum, vagina, or penis; and avoiding sexual contact with multiple partners, those known to be HIV positive, those who use illicit injectable drugs, and those who are sexual partners of people who inject drugs.
- Teach patient and family how to prevent disease transmission, including hand hygiene and methods of safely handling items soiled with bodily fluids.
- Instruct patient not to donate blood.
- Emphasize importance of taking medication as prescribed. Assist patient and caregivers in fitting the medication regimen into their lives.
- Teach medication administration, including IV preparations.
- Teach guidelines about infection, follow-up care, diet, rest, and activities.
- Instruct patient and family how to administer enteral or parenteral feedings, if applicable.
- Offer support and guidance in coping with this disease.

CONTINUING CARE

- Refer patient and family for home care nursing or hospice for physical and emotional support.
- Assist family and caregivers in providing supportive care.
- Assist in administration of parenteral antibiotics, chemotherapy, nutrition, complicated wound care, and respiratory care.
- Provide emotional support to patient and family.
- Refer patient to community programs, housekeeping assistance, meals, transportation, shopping, individual and group therapy, support for caregivers, telephone networks for the homebound, and legal and financial assistance.
- Encourage patient and family to discuss end-of-life decisions.

Evaluation

Expected Patient Outcomes

- Maintains skin integrity
- Resumes usual bowel habits

- Experiences no infections
- Maintains adequate level of activity tolerance
- Maintains usual level of thought processes
- Maintains effective airway clearance
- Experiences increased sense of comfort and less pain
- Maintains adequate nutritional status
- Experiences decreased sense of social isolation
- Progresses through grieving process
- Reports increased understanding of AIDS and participates in self-care activities as possible
- Remains free of complications

For more information, see Chapter 52 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Acute Coronary Syndrome and Myocardial Infarction

Acute coronary syndrome (ACS) is an emergent situation characterized by an acute onset of myocardial ischemia that results in myocardial death (ie, myocardial infarction [MI]) if definitive interventions do not occur promptly). (Although the terms coronary occlusion, heart attack, and MI are used synonymously, the preferred term is MI.)

In unstable angina, there is reduced blood flow in a coronary artery, often due to rupture of an atherosclerotic plaque, but the artery is not completely occluded. This is an acute situation that is sometimes referred to as preinfarction angina because the patient will likely have an MI if prompt interventions do not occur.

In an MI, an area of the myocardium is permanently destroyed, typically because plaque rupture and subsequent thrombus formation result in complete occlusion of the artery. Vasospasm (sudden constriction or narrowing) of a coronary artery, decreased oxygen supply (eg, from acute blood loss, anemia, or low blood pressure), and increased demand for oxygen (eg, from a rapid heart rate, thyrotoxicosis, or ingestion

of cocaine) are other causes of MI. In each case, a profound imbalance exists between myocardial oxygen supply and demand. An MI may be defined by the type, the location of the injury to the ventricular wall, or by the point in time in the process of infarction (acute, evolving, old).

Clinical Manifestations

In many cases, the signs and symptoms of MI cannot be distinguished from those of unstable angina, hence, the evolution of the term ACS.

- Chest pain that occurs suddenly and continues despite rest and medication is the primary presenting symptom.
- Some patients have prodromal symptoms or a previous diagnosis of coronary artery disease (CAD), but about half report no previous symptoms.
- Patient may present with a combination of symptoms, including chest pain, shortness of breath, indigestion, nausea, and anxiety.
- Patient may have cool, pale, and moist skin; heart rate and respiratory rate may be faster than normal. These signs and symptoms, which are caused by stimulation of the sympathetic nervous system, may be present for only a short time or may persist.

Assessment and Diagnostic Methods

- Patient history (description of presenting symptom; history of previous illnesses and family health history, particularly of heart disease). Previous history should also include information about patient's risk factors for heart disease.
- Electrocardiography (ECG) within 10 minutes of pain onset or arrival at the emergency department; echocardiography to evaluate ventricular function.
- Cardiac enzymes and biomarkers (creatine kinase isoenzymes, myoglobin, and troponin).

Medical Management

The goals of medical management are to minimize myocardial damage, preserve myocardial function, and prevent complications such as lethal dysrhythmias and cardiogenic shock.

- Reperfusion via emergency use of thrombolytic medications or percutaneous coronary intervention (PCI).

- Reduce myocardial oxygen demand and increase oxygen supply with medications, oxygen administration, and bed rest.
- Coronary artery bypass or minimally invasive direct coronary artery bypass (MIDCAB).

Pharmacologic Therapy

- Nitrates (nitroglycerin) to increase oxygen supply
- Anticoagulants (aspirin, heparin)
- Analgesics (morphine sulfate)
- Angiotensin-converting enzyme (ACE) inhibitors
- Beta-blocker initially, and a prescription to continue its use after hospital discharge
- Thrombolytics (alteplase [t-PA, Activase] and reteplase [r-PA, TNKase]): must be administered as early as possible after the onset of symptoms, generally within 3 to 6 hours

NURSING PROCESS

The Patient with ACS

Assessment

Obtain baseline data on current status of patient for comparison with ongoing status. Include history of chest pain or discomfort, difficulty breathing (dyspnea), palpitations, unusual fatigue, faintness (syncope), or sweating (diaphoresis). Perform a complete physical assessment, which is crucial for detecting complications and any change in status. The examination should include the following:

- Assess level of consciousness.
- Evaluate chest pain (most important clinical finding).
- Assess heart rate and rhythm; dysrhythmias may indicate not enough oxygen to the myocardium.
- Assess heart sounds; S_3 can be an early sign of impending left ventricular failure.
- Measure blood pressure to determine response to pain and treatment; note pulse pressure, which may be narrowed after an MI, suggesting ineffective ventricular contraction.
- Assess peripheral pulses: rate, rhythm, and volume.
- Evaluate skin color and temperature.

- Auscultate lung fields at frequent intervals for signs of ventricular failure (crackles in lung bases).
- Assess bowel motility; mesenteric artery thrombosis is a potentially fatal complication.
- Observe urinary output and check for edema; an early sign of cardiogenic shock is hypotension with oliguria.
- Examine IV lines and sites frequently.

Diagnosis

Nursing Diagnoses

- Ineffective cardiac tissue perfusion related to reduced coronary blood flow
- Risk for imbalanced fluid volume
- Risk for ineffective peripheral tissue perfusion related to decreased cardiac output from left ventricular dysfunction
- Death anxiety
- Deficient knowledge about post-ACS self-care

Collaborative Problems/Potential Complications

- Acute pulmonary edema
- Heart failure
- Cardiogenic shock
- Dysrhythmias and cardiac arrest
- Pericardial effusion and cardiac tamponade

Planning and Goals

The major goals of the patient include relief of pain or ischemic signs (eg, ST-segment changes) and symptoms, prevention of myocardial damage, absence of respiratory dysfunction, maintenance or attainment of adequate tissue perfusion, reduced anxiety, adherence to the self-care program, and absence or early recognition of complications.

Nursing Interventions

Relieving Pain and Other Signs and Symptoms of Ischemia

- Administer oxygen in tandem with medication therapy to assist with relief of symptoms (inhalation of oxygen reduces pain associated with low levels of circulating oxygen).

- Assess vital signs frequently as long as patient is experiencing pain.
- Assist patient to rest with back elevated or in cardiac chair to decrease chest discomfort and dyspnea.

Improving Respiratory Function

- Assess respiratory function to detect early signs of complications.
- Monitor fluid volume status to prevent overloading the heart and lungs.
- Encourage patient to breathe deeply and change position often to prevent pooling of fluid in lung bases.

Promoting Adequate Tissue Perfusion

- Keep patient on bed or chair rest to reduce myocardial oxygen consumption.
- Check skin temperature and peripheral pulses frequently to determine adequate tissue perfusion.

Reducing Anxiety

- Develop a trusting and caring relationship with patient; provide information to the patient and family in an honest and supportive manner.
- Ensure a quiet environment, prevent interruptions that disturb sleep, use a caring and appropriate touch, teach relaxation techniques, use humor, and provide spiritual support consistent with the patient's beliefs. Music therapy and pet therapy may also be helpful.
- Provide frequent and private opportunities to share concerns and fears.
- Provide an atmosphere of acceptance to help patient know that his or her feelings are realistic and normal.

Monitoring and Managing Complications

Monitor closely for cardinal signs and symptoms that signal onset of complications.

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE

- Identify the patient's priorities, provide adequate education about heart-healthy living, and facilitate the patient's involvement in a cardiac rehabilitation program.

- Work with the patient to develop a plan to meet specific needs to enhance compliance.

CONTINUING CARE

- Provide home care referral if warranted.
- Assist the patient with scheduling and keeping follow-up appointments and with adhering to the prescribed cardiac rehabilitation regimen.
- Provide reminders about follow-up monitoring, including periodic laboratory testing and ECGs, as well as general health screening.
- Monitor the patient's adherence to dietary restrictions and to prescribed medications.
- If the patient is receiving home oxygen, ensure that the patient is using the oxygen as prescribed and that appropriate home safety measures are maintained.
- If the patient has evidence of heart failure secondary to an MI, appropriate home care guidelines for the patient with heart failure are followed.

Evaluation

Expected Patient Outcomes

- Experiences relief of angina
- Has stable cardiac and respiratory status
- Maintains adequate tissue perfusion
- Exhibits decreased anxiety
- Complies with self-care program
- Experiences absence of complications

For more information, see Chapter 28 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Acute Respiratory Distress Syndrome

Acute respiratory distress syndrome (ARDS) is a severe form of acute lung injury characterized by sudden and progressive pulmonary edema, increasing bilateral infiltrates, hypoxemia

unresponsive to oxygen supplementation, and the absence of an elevated left atrial pressure. ARDS occurs when inflammatory triggers initiate the release of cellular and chemical mediators, causing injury to the alveolar capillary membrane in addition to other structural damage to the lungs. Factors associated with the development of ARDS include direct injury to the lungs (eg, smoke inhalation) or indirect insult to the lungs (eg, shock). ARDS has been associated with a mortality rate ranging from 25% to 58%, with the major cause of death in ARDS being nonpulmonary multiple-system organ failure, often with sepsis.

Clinical Manifestations

- Rapid onset of severe dyspnea, usually 12 to 48 hours after an initiating event
- Intercostal retractions and crackles may be present
- Arterial hypoxemia not responsive to oxygen supplementation
- Lung injury then progresses to fibrosing alveolitis with persistent, severe hypoxemia
- Increased alveolar dead space and decreased pulmonary compliance

Assessment and Diagnostic Findings

- Plasma brain natriuretic peptide (BNP) levels
- Echocardiography
- Pulmonary artery catheterization

Medical Management

- Identify and treat the underlying condition; provide aggressive, supportive care (intubation and mechanical ventilation; circulatory support, adequate fluid volume, and nutritional support).
- Use supplemental oxygen as the patient begins the initial spiral of hypoxemia.
- Monitor ABG values, pulse oximetry, and pulmonary function testing.
- As disease progresses, use positive end-expiratory pressure (PEEP).
- Treat hypovolemia carefully; avoid overload (inotropic or vasopressor agents may be required).

- There is no specific pharmacologic treatment for ARDS except supportive care. Numerous pharmacologic treatments are under investigation to stop the cascade of events leading to ARDS (eg, surfactant replacement therapy, pulmonary antihypertensive agents, and antisepsis agents).
- Provide nutritional support (35 to 45 kcal/kg daily).

Nursing Management

- Closely monitor the patient; frequently assess effectiveness of treatment (eg, oxygen administration, nebulizer therapy, chest physiotherapy, endotracheal intubation or tracheostomy, mechanical ventilation, suctioning, bronchoscopy).
- Consider other needs of the patient (eg, positioning, anxiety, rest).
- Identify any problems with ventilation that may cause an anxiety reaction: tube blockage, other acute respiratory problems (eg, pneumothorax, pain), a sudden decrease in the oxygen level, the level of dyspnea; or ventilator malfunction.
- Sedation may be required to decrease the patient's oxygen consumption, allow the ventilator to provide full support of ventilation, and decrease the patient's anxiety.
- If sedatives do not work, paralytic agents (used for the shortest time possible) may be administered (with adequate sedation and pain management); reassure the patient that paralysis is a result of the medication and is temporary; describe the purpose and effects of the paralytic agents to the patient's family.
- Closely monitor patients on paralytic agents: ensure that the patient is not disconnected from ventilator and that all ventilator and patient alarms are on at all times, provide eye care, minimize complications related to neuromuscular blockade, anticipate the patient's needs regarding pain and comfort.

For more information, see Chapter 23 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Addison's Disease (Adrenocortical Insufficiency)

Addison's disease occurs when the adrenal cortex function is inadequate to meet the patient's need for cortical hormones. Autoimmune or idiopathic atrophy of the adrenal glands is responsible for the vast majority of cases. Other causes include surgical removal of both adrenal glands or infection (tuberculosis or histoplasmosis) of the adrenal glands. Inadequate secretion of adrenocorticotropic hormone (ACTH) from the primary pituitary gland also results in adrenal insufficiency. Therapeutic use of corticosteroids is the most common cause of adrenocortical insufficiency. Symptoms may also result from sudden cessation of exogenous adrenocortical hormonal therapy, which interferes with normal feedback mechanisms.

Clinical Manifestations

Chief clinical manifestations include muscle weakness, anorexia, GI symptoms, fatigue, emaciation, dark pigmentation of the skin and mucous membranes, hypotension, low blood glucose, low serum sodium, and high serum potassium. The onset usually occurs with nonspecific symptoms. Mental changes (depression, emotional lability, apathy, and confusion) are present in 60% to 80% of patients. In severe cases, disturbance of sodium and potassium metabolism may be marked by depletion of sodium and water and severe, chronic dehydration.

Addisonian Crisis

This medical emergency develops as the disease progresses. Signs and symptoms include the following:

- Cyanosis and classic signs of circulatory shock: pallor, apprehension, rapid and weak pulse, rapid respirations, and low blood pressure.
- Headache, nausea, abdominal pain, diarrhea, confusion, and restlessness.
- Slight overexertion, exposure to cold, acute infections, or a decrease in salt intake may lead to circulatory collapse, shock, and death.
- Stress of surgery or dehydration from preparation for diagnostic tests or surgery may precipitate addisonian or hypotensive crisis.

Assessment and Diagnostic Findings

Greatly increased plasma ACTH (more than 22.0 pmol/L); serum cortisol level lower than normal (less than 165 nmol/L) or in the low-normal range; decreased blood glucose (hypoglycemia) and sodium (hyponatremia) levels, increased serum potassium concentration (hyperkalemia), and increased WBC count (leukocytosis).

Medical Management

Immediate treatment is directed toward combating circulatory shock:

- Restore blood circulation, administer fluids and corticosteroids, monitor vital signs, and place patient in a recumbent position with legs elevated.
- Administer IV hydrocortisone, followed by 5% dextrose in normal saline.
- Vasopressor amines may be required if hypotension persists.
- Antibiotics may be administered if infection has precipitated adrenal crisis.
- Oral intake may be initiated as soon as tolerated.
- If adrenal gland does not regain function, lifelong replacement of corticosteroids and mineralocorticoids is required.
- Dietary intake should be supplemented with salt during times of GI losses of fluids through vomiting and diarrhea.

Nursing Management

Assessing the Patient

Assessment focuses on fluid imbalance and stress.

- Monitor blood pressure and pulse rate as the patient moves from a lying, sitting, and standing position to assess for inadequate fluid volume.
- Assess skin color and turgor.
- Assess history of weight changes, muscle weakness, and fatigue.
- Ask patient and family about onset of illness or increased stress that may have precipitated crisis.

Monitoring and Managing Addisonian Crisis

- Monitor for signs and symptoms indicative of addisonian crisis, which can include shock; hypotension; rapid, weak pulse; rapid respiratory rate; pallor; and extreme weakness.

- Advise patient to avoid physical and psychological stressors such as cold exposure, overexertion, infection, and emotional distress.
- Immediately treat patient with addisonian crisis with IV administration of fluid, glucose, and electrolytes, especially sodium; replacement of missing steroid hormones; and vasopressors.
- Anticipate and meet the patient's needs to promote return to a precrisis state.

Restoring Fluid Balance

- Encourage the patient to consume foods and fluids that assist in restoring and maintaining fluid and electrolyte balance.
- Along with the dietitian, help the patient to select foods high in sodium during GI tract disturbances and in very hot weather.
- Instruct the patient and family to administer hormone replacement as prescribed and to modify the dosage during illness and other stressful situations.
- Provide written and verbal instructions about the administration of mineralocorticoid (Florinef) or corticosteroid (prednisone) as prescribed.

Improving Activity Tolerance

- Avoid unnecessary activities and stress that might precipitate a hypotensive episode.
- Detect signs of infection or presence of stressors that may have triggered the crisis.
- Explain rationale for minimizing stress during acute crisis.

Promoting Home- and Community-Based Care

Teaching Patients Self-Care

- Give patient and family explicit verbal and written instructions about the rationale for replacement therapy and proper dosage.
- Teach patient and family how to modify drug dosage and increase salt intake in times of illness, very hot weather, and stressful situations.
- Instruct patient to modify diet and fluid intake to maintain fluid and electrolyte balance.

- Provide patient and family with preloaded, single-injection syringes of corticosteroid for use in emergencies and instruct when and how to use.
- Advise patient to inform health care providers (eg, dentists) of steroid use.
- Urge patient to wear a medical alert bracelet and to carry information at all times about the need for corticosteroids.
- Teach patient and family signs of excessive or insufficient hormone replacement.

Continuing Care

- If patient cannot return to work and family responsibilities after hospital discharge, refer to home health care nurse to assess the patient's recovery, monitor hormone replacement, and evaluate stress in the home.
- Assess patient's and family's knowledge about medication therapy and dietary modifications.
- Assess patient's plans for follow-up visits to clinic or physician's office.
- Remind the patient and family about the importance of participating in health promotion activities and health screening.

For more information, see Chapter 42 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Alzheimer's Disease

Alzheimer's disease (AD) is a progressive, irreversible, degenerative neurologic disease that begins insidiously and is characterized by gradual losses of cognitive function and disturbances in behavior and affect. It is important to note that AD is not a normal part of aging.

Although the greatest risk factor for AD is increasing age, many environmental, dietary, and inflammatory factors also may determine whether a person suffers from this cognitive disease. AD is a complex brain disorder caused by a combination of various factors that may include genetics, neurotransmitter changes, vascular abnormalities, stress hormones, circadian changes, head trauma, and the presence of seizure disorders.

AD can be classified into two types: familial or early-onset AD (which is rare, and accounts for less than 10% of cases) and sporadic or late-onset AD.

Clinical Manifestations

Symptoms are highly variable; some include the following:

- In early disease there is forgetfulness and subtle memory loss, although social skills and behavioral patterns remain intact. Forgetfulness is manifested in many daily actions with progression of the disease (eg, the patient gets lost in a familiar environment or repeats the same stories).
- Conversation becomes difficult, and word-finding difficulties occur.
- Ability to formulate concepts and think abstractly disappears.
- Patient may exhibit inappropriate impulsive behavior.
- Personality changes are evident; patient may become depressed, suspicious, paranoid, hostile, and combative.
- Speaking skills deteriorate to nonsense syllables; agitation and physical activity increase.
- Voracious appetite may develop from high activity level; dysphagia is noted with disease progression.
- Eventually patient requires help with all aspects of daily living, including toileting because incontinence occurs.
- Terminal stage may last for months or years.

Assessment and Diagnostic Findings

The diagnosis, which is one of exclusion, is confirmed at autopsy, but an accurate clinical diagnosis can be made in about 90% of cases.

- Clinical symptoms are found through health history, including physical findings and results from functional abilities assessments (eg, Mini-Mental Status Examination)
- Electroencephalography (EEG)
- Computed tomography (CT) scan
- Magnetic resonance imaging (MRI)
- Laboratory tests (complete blood cell count, chemistry profile, and vitamin B_{12} and thyroid hormone levels) and examination of the cerebrospinal fluid (CSF)

Medical Management

Without a cure or a way to slow progression of AD, treatment relies on managing cognitive symptoms with cholinesterase inhibitors, such as donepezil hydrochloride (Aricept), rivastigmine tartrate (Exelon), galantamine hydrobromide (Razadyne [formerly known as Reminyl]), and tacrine (Cognex). These drugs enhance acetylcholine uptake in the brain to maintain memory skills for a period of time. Donepezil and the newest medication memantine (Namenda) can be used for management of moderate to severe AD symptoms.

NURSING PROCESS

The Patient with AD

Assessment

Obtain health history with mental status examination and physical examination, noting symptoms indicating dementia. Report findings to physician. As indicated, assist with diagnostic evaluation, promoting calm environment to maximize patient safety and cooperation.

Nursing Diagnoses

- Impaired thought processes related to decline in cognitive function
- Risk for injury related to decline in cognitive function
- Anxiety related to confused thought processes
- Imbalanced nutrition: less than body requirements related to cognitive decline
- Activity intolerance related to imbalance in activity/rest pattern
- Deficient self-care, bathing/hygiene, feeding, toileting related to cognitive decline
- Impaired social interaction related to cognitive decline
- Deficient knowledge of family/caregiver related to care for patient as cognitive function declines
- Ineffective family processes related to decline in patient's cognitive function

Planning and Goals

Goals for the patient may include supporting cognitive function, physical safety, reduced anxiety and agitation, adequate nutrition, improved communication, activity tolerance, self-care, socialization, and support and education of caregivers.

Nursing Interventions

Supporting Cognitive Function

- Provide a calm, predictable environment to minimize confusion and disorientation.
- Help patient feel a sense of security with a quiet, pleasant manner; clear, simple explanations; and use of memory aids and cues.

Promoting Physical Safety

- Provide a safe environment (whether at home or in the hospital) to allow patient to move about as freely as possible and relieve family's worry about safety.
- Prevent falls and other accidents by removing obvious hazards and providing adequate lighting; install handrails in the home.
- Prohibit driving.
- Allow smoking only with supervision.
- Reduce wandering behavior with gentle persuasion and distraction. Supervise all activities outside the home to protect patient. As needed, secure doors leading from the house. Ensure that patient wears an identification bracelet or neck chain.
- Avoid restraints because they may increase agitation.

Promoting Independence in Self-Care Activities

- Simplify daily activities into short achievable steps so that patient feels a sense of accomplishment.
- Maintain patient's personal dignity and autonomy.
- Encourage patient to make choices when appropriate and to participate in self-care activities as much as possible.

Reducing Anxiety and Agitation

- Provide emotional support to reinforce a positive self-image.

- When skill losses occur, adjust goals to fit patient's declining ability and structure activities to help prevent agitation.
- Keep the environment simple, familiar, and noise-free; limit changes.
- Remain calm and unhurried, particularly if the patient is experiencing a combative, agitated state known as catastrophic reaction (overreaction to excessive stimulation).

Improving Communication

- Reduce noises and distractions.
- Use easy-to-understand sentences to convey messages.

Providing for Socialization and Intimacy Needs

- Encourage visits, letters, and phone calls (visits should be brief and nonstressful, with one or two visitors at a time).
- Encourage patient to participate in simple activities or hobbies.
- Advise that the nonjudgmental friendliness of a pet can provide satisfying activity and an outlet for energy.
- Encourage spouse to talk about any sexual concerns and suggest sexual counseling if necessary.

Promoting Adequate Nutrition

- Keep mealtimes simple and calm; avoid confrontations.
- Cut food into small pieces to prevent choking, and convert liquids to gelatin to ease swallowing. Offer one dish at a time.
- Prevent burns by serving typically hot food and beverages warm.

Balancing Activity and Rest

- Offer music, warm milk, or a back rub to help patient relax and fall asleep.
- To enhance nighttime sleep, provide sufficient opportunities for daytime exercise. Discourage long periods of daytime sleeping.
- Assess and address any unmet underlying physical or psychological needs that may prompt wandering or other inappropriate behavior.

Supporting Home- and Community-Based Care

- Be sensitive to the highly emotional issues that the family is confronting.

- Notify the local adult protective services agency if neglect or abuse is suspected.
- Refer family to the Alzheimer's Association for assistance with family support groups, respite care, and adult day care services.

Evaluation

Expected Patient Outcomes

- Patient maintains cognitive, functional, and social interaction abilities for as long as possible.
- Patient remains free of injury.
- Patient participates in self-care activities as much as possible.
- Patient demonstrates minimal anxiety and agitation.
- Patient is able to communicate (verbally or nonverbally).
- Patient's socialization and intimacy needs are met.
- Patient receives adequate nutrition, activity, and rest.
- Patient and family caregivers are knowledgeable about condition and treatment and care regimens.

For more information, see Chapter 12 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Amyotrophic Lateral Sclerosis

Amyotrophic lateral sclerosis (ALS) is a disease of unknown cause in which there is a loss of motor neurons (nerve cells controlling muscles) in the anterior horns of the spinal cord and the motor nuclei of the lower brain stem. As these cells die, the muscle fibers that they supply undergo atrophic changes. The degeneration of the neurons may occur in both upper and lower motor neuron systems. Possible causes of ALS include autoimmune disease, free radical damage, oxidative stress, and transmission of an autosomal dominant trait for familial ALS (5% to 10%). In the United States, it is often referred to as Lou Gehrig's disease. Death usually occurs from infection, respiratory failure, or aspiration. The average time from onset to death is about 3 to 5 years.

Clinical Manifestations

Clinical features of ALS depend on the location of the affected motor neurons. In most patients, the chief symptoms are fatigue, progressive muscle weakness, cramps, fasciculations (twitching), and incoordination.

Loss of Motor Neurons in Anterior Horns of Spinal Cord

- Progressive weakness and atrophy of the arms, trunk, or leg muscles.
- Spasticity; deep tendon stretch reflexes are brisk and overactive.
- Anal and bladder sphincters usually remain intact.

Weakness in Muscles Supplied by Cranial Nerves (25% of Patients in Early Stage)

- Difficulty talking, swallowing, and ultimately breathing
- Soft palate and upper esophageal weakness, causing liquids to be regurgitated through nose
- Impaired ability to laugh, cough, or blow the nose

Bulbar Muscle Impairment

- Progressive difficulty in speaking and swallowing, and aspiration
- Nasal voice and unintelligible speech
- Emotional lability
- Eventually, compromised respiratory function

Assessment and Diagnostic Methods

Diagnosis is based on signs and symptoms because no clinical or laboratory tests are specific for this disease. Electromyographic (EMG) and muscle biopsy studies, MRI, and neuropsychological testing may be helpful.

Medical Management

No specific treatment for ALS is available. Symptomatic treatment includes the following:

- Riluzole (Rilutek), a glutamate antagonist.
- Baclofen, dantrolene sodium, or diazepam for spasticity.
- Mechanical ventilation (using negative-pressure ventilators) for alveolar hypoventilation; noninvasive positive-pressure ventilation is also an option.

- Enteral feedings (percutaneous endoscopic gastrostomy [PEG]) for patients with aspiration or swallowing difficulties.
- Decision about life support measures is based on patient's and family's understanding of the disease, prognosis, and implications of initiating such therapy.
- Encourage patient to complete an advance directive or "living will" to preserve autonomy.

Nursing Management

The nursing care of the patient with ALS is generally the same as the basic care plan for patients with degenerative neurologic disorders (see "Myasthenia Gravis" in Chapter M). Encourage patient and family to contact the ALS Association for information and support.

For more information, see Chapter 65 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Anaphylaxis

Anaphylaxis is a clinical response to an immediate (type I hypersensitivity) immunologic reaction between a specific antigen and an antibody. The reaction results from a rapid release of IgE-mediated chemicals, which can induce a severe, life-threatening allergic reaction. Substances that most commonly cause anaphylaxis include foods, medications, insect stings, and latex. Foods that are common causes of anaphylaxis include peanuts, tree nuts, shellfish, fish, milk, eggs, soy, and wheat. Many medications have been implicated in anaphylaxis. Those that are most frequently reported include antibiotics (eg, penicillin), radiocontrast agents, IV anesthetics, aspirin and other nonsteroidal anti-inflammatory drugs (NSAIDs), and opioids. Closely related to anaphylaxis is a nonallergenic anaphylaxis (anaphylactoid) reaction.

Clinical Manifestations

Anaphylactic reactions produce a clinical syndrome that affects multiple organ systems. Reactions may be categorized as mild, moderate, or severe. The severity depends on the degree of allergy and the dose of allergen.

Mild

Symptoms include peripheral tingling, a warm sensation, fullness in the mouth and throat, nasal congestion, periorbital swelling, pruritus, sneezing, and tearing eyes. Symptoms begin within 2 hours of exposure.

Moderate

Symptoms include flushing, warmth, anxiety, and itching in addition to any of the milder symptoms. More serious reactions include bronchospasm and edema of the airways or larynx with dyspnea, cough, and wheezing. The onset of symptoms is the same as for a mild reaction.

Severe

Severe systemic reactions have an abrupt onset with the same signs and symptoms described previously. Symptoms progress rapidly to bronchospasm, laryngeal edema, severe dyspnea, cyanosis, and hypotension. Dysphagia, abdominal cramping, vomiting, diarrhea, and seizures can also occur. Cardiac arrest and coma may follow.

Assessment and Diagnostic Methods

Diagnostic evaluation of the patient with allergic disorders commonly includes blood tests (complete blood cell count [CBC] with differential, high total serum IgE levels), smears of body secretions, skin tests, and the radioallergosorbent test (RAST).

Prevention

Prevention by avoidance of allergens is of utmost importance. If avoidance of exposure to allergens is impossible, the patient should be instructed to carry and administer epinephrine to prevent an anaphylactic reaction in the event of exposure to the allergen. Health care providers should always obtain a careful history of any sensitivities before administering medications. Venom immunotherapy may be given to people who are allergic to insect venom. Insulin-allergic patients with diabetes or penicillin-sensitive patients may require desensitization.

Medical Management

Respiratory and cardiovascular functions are evaluated and cardiopulmonary resuscitation (CPR) is initiated in cases of cardiac arrest. Oxygen is administered in high concentrations

during CPR or when the patient is cyanotic, dyspneic, or wheezing. Patients with mild reactions need to be educated about the risk for recurrences. Patients with severe reactions need to be observed for 12 to 14 hours.

Pharmacologic Therapy

- Epinephrine, antihistamines, and corticosteroids may be given to prevent recurrences of the reaction and to relieve urticaria and angioedema.
- IV fluids (eg, normal saline solution), volume expanders, and vasopressor agents are administered to maintain blood pressure and normal hemodynamic status; glucagon may be administered.
- Aminophylline and corticosteroids may also be administered to improve airway patency and function.

Nursing Management

- Explain to the patient who has recovered from anaphylaxis what occurred and instruct about avoiding future exposure to antigens and how to administer emergency medications to treat anaphylaxis.
- Instruct about antigens that should be avoided and about other strategies to prevent recurrence of anaphylaxis.
- Instruct the patient and family how to use preloaded syringes of epinephrine, if needed, and have the patient and family demonstrate correct administration.

For more information, see Chapter 53 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Anemia

Anemia is a condition in which the hemoglobin concentration is lower than normal; it reflects the presence of fewer than the normal number of erythrocytes within the circulation. As a result, the amount of oxygen delivered to body tissues is also diminished. Anemia is not a specific disease state but a sign of an underlying disorder. It is by far the most common

hematologic condition. There are several kinds of anemia. A physiologic approach classifies anemia according to whether the deficiency in erythrocytes is caused by a defect in their production (hypoproliferative anemia), by their destruction (hemolytic anemia), or by their loss (bleeding).

Clinical Manifestations

Aside from the severity of the anemia itself, several factors influence the development of anemia-associated symptoms: the rapidity with which the anemia has developed, the duration of the anemia (ie, its chronicity), the metabolic requirements of the patient, other concurrent disorders or disabilities (eg, cardiac or pulmonary disease), and complications or concomitant features of the condition that produced the anemia. In general, the more rapidly an anemia develops, the more severe its symptoms. Pronounced symptoms of anemia include the following:

- Dyspnea, chest pain, muscle pain or cramping, tachycardia
- Weakness, fatigue, general malaise
- Pallor of the skin and mucous membranes (conjunctivae, oral mucosa)
- Jaundice (megaloblastic or hemolytic anemia)
- Smooth, red tongue (iron-deficiency anemia)
- Beefy, red, sore tongue (megaloblastic anemia)
- Angular cheilosis (ulceration of the corner of the mouth)
- Brittle, ridged, concave nails and pica (unusual craving for starch, dirt, ice) in patients with iron-deficiency anemia

Assessment and Diagnostic Methods

- Complete hematologic studies (eg, hemoglobin, hematocrit, reticulocyte count, and red blood cell (RBC) indices, particularly the mean corpuscular volume [MCV] and RBC distribution width [RDW])
- Iron studies (serum iron level, total iron-binding capacity [TIBC], percent saturation, and ferritin)
- Serum vitamin B_{12} and folate levels; haptoglobin and erythropoietin levels
- Bone marrow aspiration
- Other studies as indicated to determine underlying illness

Medical Management

Management of anemia is directed toward correcting or controlling the cause of the anemia; if the anemia is severe, the erythrocytes that are lost or destroyed may be replaced with a transfusion of packed RBCs (PRBCs).

Gerontologic Considerations

Anemia is the most common hematologic condition affecting elderly patients. The impact of anemia on function is significant. A review among the elderly has noted that increased fragility, decreased mobility and exercise performance, increased risk of falling, diminished cognitive function, increased risk of developing dementia and major depression, and lower skeletal muscle and bone density are associated with anemia.

NURSING PROCESS

The Patient with Anemia

Assessment

- Obtain a health history, perform a physical examination, and obtain laboratory values.
- Ask patient about extent and type of symptoms experienced and impact of symptoms on lifestyle; medication history; alcohol intake; athletic endeavors (extreme exercise).
- Ask about family history of inherited anemias.
- Perform nutritional assessment: Ask about dietary habits resulting in nutritional deficiencies, such as those of iron, vitamin B_{12}, and folic acid.
- Monitor relevant laboratory test results; note changes.
- Assess cardiac status (for symptoms of increased workload or heart failure): tachycardia, palpitations, dyspnea, dizziness, orthopnea, exertional dyspnea, cardiomegaly, hepatomegaly, peripheral edema.
- Assess for GI function: nausea, vomiting, diarrhea, melena or dark stools, occult blood, anorexia, glossitis; women should be questioned about their menstrual periods (eg, excessive menstrual flow, other vaginal bleeding) and the use of iron supplements during pregnancy.

- Assess for neurologic deficits (important with pernicious anemia): presence and extent of peripheral numbness and paresthesias, ataxia, poor coordination, confusion.

Diagnosis

Nursing Diagnoses

- Fatigue related to decreased hemoglobin and diminished oxygen-carrying capacity of the blood
- Altered nutrition, less than body requirements, related to inadequate intake of essential nutrients
- Altered tissue perfusion related to inadequate hemoglobin and hematocrit
- Noncompliance with prescribed therapy

Collaborative Problems/Potential Complications

- Heart failure
- Angina
- Paresthesias
- Confusion

Planning and Goals

The major goals for the patient may include decreased fatigue, attainment or maintenance of adequate nutrition, maintenance of adequate tissue perfusion, compliance with prescribed therapy, and absence of complications.

Nursing Interventions

Managing Fatigue

- Assist patient to prioritize activities and establish a balance between activity and rest.
- Encourage patient with chronic anemia to maintain physical activity and exercise to prevent deconditioning.

Maintaining Adequate Nutrition

- Encourage a healthy diet.
- Teach patient to avoid or limit intake of alcohol.
- Plan dietary teaching sessions for patient and family; consider cultural aspects of nutrition.
- Discuss nutritional supplements (eg, vitamins, iron, folate) as prescribed.

Maintaining Adequate Perfusion

- Monitor vital signs and pulse oximeter readings closely, and adjust or withhold medications (antihypertensives) as indicated.
- Administer supplemental oxygen, transfusions, and IV fluids as ordered.

Promoting Compliance with Prescribed Therapy

- Discuss with patients the purpose of their medication, how to take the medication and over what time period, and how to manage any side effects; ensure patient knows that abruptly stopping some medications can have serious consequences.
- Assist the patient to incorporate the therapeutic plan into everyday activities, rather than merely giving the patient a list of instructions.
- Provide assistance to obtain needed insurance coverage for expensive medications (eg, growth factors) or to explore alternative ways to obtain these medications.

Monitoring and Managing Complications

- Assess patient with anemia for heart failure.
- Perform a neurologic assessment for patients with known or suspected megaloblastic anemia.

Evaluation

Expected Patient Outcomes

- Reports less fatigue
- Attains and maintains adequate nutrition
- Maintains adequate perfusion
- Experiences no or minimal complications

For more information, see Chapter 33 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Anemia, Aplastic

Aplastic anemia is a rare disease caused by a decrease in or damage to marrow stem cells, damage to the microenvironment

within the marrow, and replacement of the marrow with fat. The precise etiology is unknown, but it is hypothesized that the body's T cells mediate an inappropriate attack against the bone marrow, resulting in bone marrow aplasia. Significant neutropenia and thrombocytopenia (ie, a deficiency of platelets) also occur. Aplastic anemia can be congenital or acquired, but most cases are idiopathic. Infections and pregnancy can trigger it, or it may be caused by certain medications, chemicals, or radiation damage. Agents that may produce marrow aplasia include benzene and benzene derivatives (eg, paint remover). Certain toxic materials, such as inorganic arsenic, glycol ethers, plutonium, and radon, have also been implicated as potential causes.

Clinical Manifestations

- Infection and the symptoms of anemia (eg, fatigue, pallor, dyspnea).
- Retinal hemorrhages.
- Purpura (bruising).
- Repeated throat infections with possible cervical lymphadenopathy.
- Other lymphadenopathies and splenomegaly sometimes occur.

Assessment and Diagnostic Methods

- Diagnosis is made by a bone marrow aspirate that shows an extremely hypoplastic or even aplastic (very few to no cells) marrow replaced with fat.

Medical Management

- Those who are younger than 60 years, who are otherwise healthy, and who have a compatible donor can be cured of the disease by a bone marrow transplant (BMT) or peripheral blood stem cell transplant (PBSCT).
- In others, the disease can be managed with immunosuppressive therapy, commonly using a combination of antithymocyte globulin (ATG) and cyclosporine or androgens.
- Supportive therapy plays a major role in the management of aplastic anemia. Any offending agent is discontinued. The patient is supported with transfusions of PRBCs and platelets as necessary.

Nursing Management

See "Nursing Management" under "Anemia" for additional information.

- Assess patient carefully for signs of infection and bleeding, as patients with aplastic anemia are vulnerable to problems related to erythrocyte, leukocyte, and platelet deficiencies.
- Monitor for side effects of therapy, particularly for hypersensitivity reaction while administering ATG.
- If patients require long-term cyclosporine therapy, monitor them for long-term effects, including renal or liver dysfunction, hypertension, pruritus, visual impairment, tremor, and skin cancer.
- Carefully assess each new prescription for drug–drug interactions, as the metabolism of ATG is altered by many other medications.
- Ensure that patients understand the importance of not abruptly stopping their immunosuppressive therapy.

For more information, see Chapter 33 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Anemia, Iron Deficiency

Iron-deficiency anemia typically results when the intake of dietary iron is inadequate for hemoglobin synthesis. Iron-deficiency anemia is the most common type of anemia in all age groups, and it is the most common anemia in the world. The most common cause of iron-deficiency anemia in men and postmenopausal women is bleeding from ulcers, gastritis, inflammatory bowel disease, or GI tumors. The most common causes of iron-deficiency anemia in premenopausal women are menorrhagia (ie, excessive menstrual bleeding) and pregnancy with inadequate iron supplementation. Patients with chronic alcoholism often have chronic blood loss from the GI tract, which causes iron loss and eventual anemia. Other causes include iron malabsorption, as is seen after gastrectomy or with celiac disease.

Clinical Manifestations

- Symptoms of anemia
- Symptoms in more severe or prolonged cases: smooth, sore tongue; brittle and ridged nails; angular cheilosis (mouth ulceration)

Assessment and Diagnostic Methods

- Bone marrow aspiration
- Laboratory values, including serum ferritin levels (indicates iron stores), blood cell count (hemoglobin, hematocrit, RBC count, MCV), serum iron level, and total iron-binding capacity

Medical Management

- Search for the cause, which may be a curable GI cancer or uterine fibroids.
- Test stool specimens for occult blood.
- People aged 50 years or older should have periodic colonoscopy, endoscopy, or x-ray examination of the GI tract to detect ulcerations, gastritis, polyps, or cancer.
- Administer prescribed iron preparations (oral, intramuscular [IM], or IV).
- Have patient continue iron preparations for 6 to 12 months.

Nursing Management

See "Nursing Management" under "Anemia" for additional information.

- Administer IM or IV iron in some cases when oral iron is not absorbed, is poorly tolerated, or is needed in large amounts.
- Administer a small test dose before IM injection to avoid risk of anaphylaxis (greater with IM than with IV injections).
- Advise patient to take iron supplements an hour before meals. If gastric distress occurs, suggest taking the supplement with meals and, after symptoms subside, resuming between-meal schedule for maximum absorption.
- Inform patient that iron salts change stool to dark green or black.
- Advise patient to take liquid forms of iron through a straw, to rinse the mouth with water, and to practice good oral hygiene after taking this medication.

- Teach preventive education, because iron-deficiency anemia is common in menstruating and pregnant women.
- Educate patient regarding foods high in iron (eg, organ and other meats, beans, leafy green vegetables, raisins, molasses).
- Instruct patient to avoid taking antacids or dairy products with iron (diminishes iron absorption).
- Provide nutritional counseling for those whose normal diet is inadequate.
- Encourage patient to continue iron therapy for total therapy time (6 to 12 months), even when fatigue is no longer present.

For more information, see Chapter 33 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Anemia, Megaloblastic (Vitamin B_{12} and Folic Acid Deficiency)

In the anemias caused by deficiencies of vitamin B_{12} or folic acid, identical bone marrow and peripheral blood changes occur because both vitamins are essential for normal DNA synthesis.

Pathophysiology

Folic Acid Deficiency

Folic acid is stored as compounds referred to as folates. The folate stores in the body are much smaller than those of vitamin B_{12}, and they are quickly depleted when the dietary intake of folate is deficient (within 4 months). Folate deficiency occurs in people who rarely eat uncooked vegetables. Alcohol increases folic acid requirements; folic acid requirements are also increased in patients with chronic hemolytic anemias and in women who are pregnant. Some patients with malabsorptive diseases of the small bowel may not absorb folic acid normally.

Vitamin B_{12} Deficiency

A deficiency of vitamin B_{12} can occur in several ways. Inadequate dietary intake is rare but can develop in strict vegetarians

who consume no meat or dairy products. Faulty absorption from the GI tract is more common, as with conditions such as Crohn's disease or after ileal resection or gastrectomy. Another cause is the absence of intrinsic factor. A deficiency may also occur if disease involving the ileum or pancreas impairs absorption. The body normally has large stores of vitamin B_{12}, so years may pass before the deficiency results in anemia.

Clinical Manifestations

Symptoms of folic acid and vitamin B_{12} deficiencies are similar, and the two anemias may coexist. Symptoms are progressive, although the course of illness may be marked by spontaneous partial remissions and exacerbations.

- Gradual development of signs of anemia (weakness, listlessness, and fatigue).
- Possible development of a smooth, sore, red tongue and mild diarrhea (pernicious anemia).
- Mild jaundice, vitiligo, and premature graying.
- Confusion may occur; more often, paresthesias in the extremities and difficulty keeping balance; loss of position sense.
- Lack of neurologic manifestations with folic acid deficiency alone.
- Without treatment, patients die, usually as a result of heart failure secondary to anemia.

Assessment and Diagnostic Findings

- Schilling test (primary diagnostic tool)
- Complete blood cell count (Hgb value as low as 4 to 5 g/dL, WBC count 2,000 to 3,000 mm^3, platelet count fewer than 50,000 mm^3; very high MCV, usually exceeding 110 μm^3)
- Serum levels of folate and vitamin B_{12} (folic acid deficiency and deficient vitamin B_{12})

Medical Management: Folic Acid Deficiency

- Increase intake of folic acid in patient's diet and administer 1 mg folic acid daily.
- Administer IM folic acid for malabsorption syndromes.
- Prescribe additional supplements as necessary, because the amount in multivitamins may be inadequate to fully replace deficient body stores.

- Prescribe folic acid for patients with alcoholism as long as they continue to consume alcohol.

Medical Management: Vitamin B_{12} Deficiency

- Provide vitamin B_{12} replacement: Vegetarians can prevent or treat deficiency with oral supplements with vitamins or fortified soy milk; when the deficiency is due to the more common defect in absorption or the absence of intrinsic factor, replacement is by monthly IM injections of vitamin B_{12}.
- A small amount of an oral dose of vitamin B_{12} can be absorbed by passive diffusion, even in the absence of intrinsic factor, but large doses (2 mg/day) are required if vitamin B_{12} is to be replaced orally.
- To prevent recurrence of pernicious anemia, vitamin B_{12} therapy must be continued for life.

Nursing Management

See "Nursing Management" under "Anemia" for additional information.

- Assess patients at risk for megaloblastic anemia for clinical manifestations (eg, inspect the skin, sclera, and mucous membranes for jaundice; note vitiligo and premature graying).
- Perform careful neurologic assessment (eg, note gait and stability; test position and vibration sense).
- Assess need for assistive devices (eg, canes, walkers) and need for support and guidance in managing activities of daily living and home environment.
- Ensure safety when position sense, coordination, and gait are affected.
- Refer for physical or occupational therapy as needed.
- When sensation is altered, instruct patient to avoid excessive heat and cold.
- Advise patient to prepare bland, soft foods and to eat small amounts frequently.
- Explain that other nutritional deficiencies, such as alcohol-induced anemia, can induce neurologic problems.
- Instruct patient in complete urine collections for the Schilling test. Also explain the importance of the test and of complying with the collection.

- Teach patient about chronicity of disorder and need for monthly vitamin B_{12} injections even when patient has no symptoms. Instruct patient how to self-administer injections, when appropriate.
- Stress importance of ongoing medical follow-up and screening, because gastric atrophy associated with pernicious anemia increases the risk of gastric carcinoma.

For more information, see Chapter 33 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Anemia, Sickle Cell

Sickle cell anemia is a severe hemolytic anemia resulting from the inheritance of the sickle hemoglobin (HbS) gene, which causes a defective hemoglobin molecule.

Pathophysiology

The defective hemoglobin molecule assumes a sickle shape when exposed to low oxygen tension. These long, rigid RBCs become lodged in small vessels and can obstruct blood flow to body tissue. If ischemia or infarction results, the patient may have pain, swelling, and fever. The sickling process takes time; if the erythrocyte is again exposed to adequate amounts of oxygen (eg, when it travels through the pulmonary circulation) before the membrane becomes too rigid, it can revert to a normal shape. For this reason, the "sickling crises" are intermittent. The HbS gene is inherited, with some people having the sickle cell trait (a carrier, inheriting one abnormal gene) and some having sickle cell disease (inheriting two abnormal genes). Sickle cell disease is found predominantly in people of African descent and less often in people who have descended from the Mediterranean countries, the Middle East, or aboriginal tribes of India.

Clinical Manifestations

Symptoms of sickle cell anemia vary and are only somewhat based on the amount of HbS. Symptoms and complications result from chronic hemolysis or thrombosis.

- Anemia, with hemoglobin values in the range of 7 to 10 g/dL.
- Jaundice is characteristic, usually obvious in the sclera.
- Bone marrow expands in childhood, sometimes causing enlargement of bones of the face and skull.
- Tachycardia, cardiac murmurs, and often cardiomegaly are associated with chronic anemia.
- Dysrhythmias and heart failure may occur in adults.
- Virtually any organ may be affected by thrombosis, but the primary sites involve those areas with slower circulation, such as the spleen, lungs, and central nervous system.
- There is severe pain in various parts of the body. All tissues and organs are vulnerable and susceptible to hypoxic damage or ischemic necrosis.
- Sickle cell crisis: sickle crisis, aplastic crisis, or sequestration crisis.
- Acute chest syndrome: fever, cough, tachycardia, and new infiltrates seen on the chest x-ray
- Pulmonary hypertension is a common sequela of sickle cell disease, and often the cause of death.

Assessment and Diagnostic Findings

The patient with sickle cell trait usually has a normal hemoglobin level, a normal hematocrit, and a normal blood smear. In contrast, the patient with sickle cell anemia has a low hematocrit level and sickled cells on the smear. The diagnosis is confirmed by hemoglobin electrophoresis.

Medical Management

Treatment of sickle cell anemia is the focus of continued research. However, aside from the equally important aggressive management of symptoms and complications, there are currently few primary treatment modalities for sickle cell diseases.

- PBSCT: May cure sickle cell anemia but is available to only a small subset of affected patients because of either the lack of a compatible donor or because severe organ damage that may be already present in the patient is a contraindication for PBSCT
- Pharmacologic therapy: Hydroxyurea, a chemotherapy agent, has been shown to be effective in increasing fetal

hemoglobin (ie, hemoglobin F) levels in patients with sickle cell anemia; arginine may be useful in managing pulmonary hypertension and acute chest syndrome

- Transfusion therapy: Has been shown to be highly effective in several situations (eg, in an acute exacerbation of anemia, in the prevention of severe complications from anesthesia and surgery, and in improving the response to infection and in severe cases of acute chest syndrome).
- Pulmonary function is monitored and pulmonary hypertension is treated early if found. Infections and acute chest syndrome, which predispose to crisis, are treated promptly. Incentive spirometry is performed to prevent pulmonary complications; bronchoscopy is done to identify source of pulmonary disease.
- Fluid restriction may be beneficial. Corticosteroids may be useful.
- Folic acid is administered daily for increased marrow requirement.
- Supportive care involves pain management (aspirin or NSAIDs, morphine, and patient-controlled analgesia), oral or IV hydration, physical and occupational therapy, physiotherapy, cognitive and behavioral intervention, and support groups.

NURSING PROCESS

The Patient with Sickle Cell Crisis

See “Nursing Management” under “Anemia” for additional information.

Assessment

- Question patients in crisis about factors that could have precipitated the crisis and measures used to prevent crisis.
- Assess all body systems, with particular emphasis on pain (0-to-10 scale, quality, and frequency), swelling, fever (all joint areas and abdomen).
- Carefully assess respiratory system, including breath sounds, oxygen saturation levels.
- Assess for signs of cardiac failure (edema, increased point of maximal impulse, and cardiomegaly [as seen on chest x-ray]).

- Elicit symptoms of cerebral hypoxia by careful neurologic examination.
- Assess for signs of dehydration and history of fluid intake; examine mucous membranes, skin turgor, urine output, serum creatinine, and BUN values.
- Assess for signs of any infectious process (examine chest and long bones and femoral head, because pneumonia and osteomyelitis are common).
- Monitor hemoglobin, hematocrit, and reticulocyte count and compare with baseline levels.
- Assess current and past history of medical management, particularly chronic transfusion therapy, hydroxyurea use, and prior treatment for infection.

Diagnosis

Nursing Diagnoses

- Acute pain related to tissue hypoxia due to agglutination of sickled cells within blood vessels
- Risk for infection
- Risk for powerlessness related to illness-induced helplessness
- Deficient knowledge regarding prevention of crisis

Collaborative Problems/Potential Complications

- Hypoxia, ischemia, infection, and poor wound healing leading to skin breakdown and ulcers
- Dehydration
- Cerebrovascular accident (CVA, brain attack, stroke)
- Anemia
- Acute and chronic renal failure
- Heart failure, pulmonary hypertension, and acute chest syndrome
- Impotence
- Poor compliance
- Substance abuse related to poorly managed chronic pain

Planning and Goals

The major goals for the patient are relief of pain, decreased incidence of crisis, enhanced sense of self-esteem and power, and absence of complications.

Nursing Interventions

Managing Pain

- Use patient's subjective description of pain and pain rating on a pain scale to guide the use of analgesic agents.
- Support and elevate any joint that is acutely swollen until swelling diminishes.
- Teach patient relaxation techniques, breathing exercises, and distraction to ease pain.
- When acute painful episode has diminished, implement aggressive measures to preserve function (eg, physical therapy, whirlpool baths, and transcutaneous nerve stimulation).

Preventing and Managing Infection

- Monitor patient for signs and symptoms of infection.
- Initiate prescribed antibiotics promptly.
- Assess patient for signs of dehydration.
- Teach patient to take prescribed oral antibiotics at home, if indicated, emphasizing the need to complete the entire course of antibiotic therapy.

Promoting Coping Skills

- Enhance pain management to promote a therapeutic relationship based on mutual trust.
- Focus on patient's strengths rather than deficits to enhance effective coping skills.
- Provide opportunities for patient to make decisions about daily care to increase feelings of control.

Increasing Knowledge

- Teach patient about situations that can precipitate a sickle cell crisis and steps to take to prevent or diminish such crises (eg, keep warm, maintain adequate hydration, avoid stressful situations).
- If hydroxyurea is prescribed for a woman of childbearing age, inform her that the drug can cause congenital harm to unborn children and advise about pregnancy prevention.

Monitoring and Managing Potential Complications

Management measures for many of the potential complications are delineated in the previous sections; additional measures should be taken to address the following issues.

LEG ULCERS

- Protect the leg from trauma and contamination.
- Use scrupulous aseptic technique to prevent nosocomial infections.
- Refer to a wound–ostomy–continence nurse, which may facilitate healing and assist with prevention.

PRIAPISM LEADING TO IMPOTENCE

- Teach patient to empty the bladder at the onset of the attack, exercise, and take a warm bath.
- Inform patient to seek medical attention if an episode persists more than 3 hours.

CHRONIC PAIN AND SUBSTANCE ABUSE

- Emphasize the importance of complying with prescribed treatment plan.
- Promote trust with patient through adequate management of acute pain during episodes of crisis.
- Suggest to patient that receiving care from a single provider over time is much more beneficial than receiving care from rotating physicians and staff in an emergency department.
- When a crisis arises, emergency department staff should contact patient's primary health care provider for optimal management.
- Promote continuity of care and establish written contracts with patient.

Promoting Home- and Community-Based Care

- Involve the patient *and his or her family* in teaching about the disease, treatment, assessment, and monitoring needed to detect complications. Also teach about vascular access device management and chelation therapy.
- Advise health care providers, patients, and families to communicate regularly.
- Provide guidelines regarding when to seek urgent care.
- Provide follow-up care for patients with vascular access devices, if necessary.

Evaluation

Expected Patient Outcomes

- Reports control of pain
- Is free of infection

- Expresses improved sense of control
- Increases knowledge about disease process
- Experiences absence of complications

For more information, see Chapter 33 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Aneurysm, Aortic

An aneurysm is a localized sac or dilation formed at a weak point in the wall of the artery. It may be classified by its shape or form. The most common forms of aneurysms are saccular and fusiform. A saccular aneurysm projects from only one side of the vessel. If an entire arterial segment becomes dilated, a fusiform aneurysm develops. Very small aneurysms due to localized infection are called mycotic aneurysms. Historically, the cause of abdominal aortic aneurysm, the most common type of degenerative aneurysm, has been attributed to atherosclerotic changes in the aorta. Occasionally, in an aorta diseased by arteriosclerosis, a tear develops in the intima or the media degenerates, resulting in a dissection. Arterial dissections are three times more common in men than in women and occur most commonly in the age group of 50 to 70 years. Aneurysms are serious because they can rupture, leading to hemorrhage and death.

Thoracic aortic aneurysms occur most frequently in men between the ages of 40 and 70 years. The thoracic area is the most common site for the development of a dissecting aneurysm. About one third of patients die from rupture. Abdominal aortic aneurysms are more common among Caucasians and affect men four times more often than women. These are most prevalent in elderly patients. Most of these aneurysms occur below the renal arteries (infrarenal aneurysms).

Gerontologic Considerations

Most abdominal aortic aneurysms occur in patients between 60 and 90 years of age. Rupture is likely with coexisting hypertension and with aneurysms more than 6 cm wide. In most cases at

this point, the chances of rupture are greater than the chance of death during surgical repair. If the elderly patient is considered at moderate risk of complications related to surgery or anesthesia, the aneurysm is not repaired until it is at least 5.5 cm (2 in) wide.

Clinical Manifestations

Thoracic Aortic Aneurysm

- Symptoms vary and depend on how rapidly the aneurysm dilates and affects the surrounding intrathoracic structures; some patients are asymptomatic.
- Constant, boring pain, which may occur only when the patient is in the supine position (prominent symptom)
- Dyspnea, cough (paroxysmal and brassy)
- Hoarseness, stridor, or weakness or complete loss of the voice (aphonia)
- Dysphagia
- Dilated superficial veins on chest, neck, or arms
- Edematous areas on chest wall
- Cyanosis
- Unequal pupils

Abdominal Aortic Aneurysm

- Only about 40% of patients with abdominal aortic aneurysms have symptoms.
- Patient complains of “heart beating” in abdomen when lying down or a feeling of an abdominal mass or abdominal throbbing.
- Cyanosis and mottling of the toes if aneurysm is associated with thrombus.

Dissecting Aneurysm

- Sudden onset with severe and persistent pain described as “tearing” or “ripping” in anterior chest or back, extending to shoulders, epigastric area, or abdomen (may be mistaken for acute MI)
- Pallor, sweating, and tachycardia
- Blood pressure elevated or markedly different from one arm to the other

Assessment and Diagnostic Findings

- Thoracic aortic aneurysm: chest x-ray, CT angiography (CTA), and transesophageal echocardiography (TEE).

- Abdominal aortic aneurysm: palpation of pulsatile mass in the middle and upper abdomen (a systolic bruit may be heard over the mass); duplex ultrasonography or CTA is used to determine the size, length, and location of the aneurysm.
- Dissecting aneurysm: arteriography, CTA, TEE, duplex ultrasonography, and magnetic resonance angiography (MRA).

Medical Management

Medical or surgical treatment depends on the type of aneurysm. For a ruptured aneurysm, prognosis is poor and surgery is performed immediately. When surgery can be delayed, medical measures include the following:

- Strict control of blood pressure
- Systolic pressure maintained at 100 to 120 mm Hg with antihypertensive agents, including diuretics, beta-blockers, ACE inhibitors, angiotensin II receptor antagonists, and calcium channel blockers

Surgical Management

An expanding or enlarging abdominal aortic aneurysm is likely to rupture. Surgery is the treatment of choice for abdominal aortic aneurysms more than 5.5 cm (2 in) wide or those that are enlarging; the standard treatment has been open surgical repair of the aneurysm by resecting the vessel and sewing a bypass graft in place. An alternative for treating an infrarenal abdominal aortic aneurysm is endovascular grafting, which involves the transluminal placement and attachment of a sutureless aortic graft prosthesis across an aneurysm.

Nursing Management

Preoperative Assessment

- Assessment is guided by anticipating a rupture (signs include persistent or intermittent back or abdominal pain that may be localized in the middle or lower abdomen or lower back) and by recognizing that the patient may have cardiovascular, cerebral, pulmonary, and renal impairment from atherosclerosis.
- Assess functional capacity of all organ systems.
- Implement medical therapies to stabilize patient.

Postoperative Assessment

- Frequently monitor pulmonary, cardiovascular, renal, and neurologic status.
- Monitor for complications: arterial occlusion, hemorrhage, infection, ischemic bowel, renal failure, and impotence.

NURSING ALERT

Constant intense back pain, falling blood pressure, and decreasing hematocrit level are signs of a rupturing abdominal aortic aneurysm. Hematomas into the scrotum, perineum, flank, or penis indicate retroperitoneal rupture. Rupture into the peritoneal cavity is rapidly fatal.

For more information, see Chapter 31 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Aneurysm, Intracranial

An intracranial (cerebral) aneurysm is a dilation of the walls of a cerebral artery that develops as a result of weakness in the arterial wall. Its cause is unknown, but it may be due to atherosclerosis, a congenital defect of the vessel walls, hypertensive vascular disease, head trauma, or advancing age. Most commonly affected are the internal carotid, anterior or posterior cerebral, anterior or posterior communicating, and middle cerebral arteries. Symptoms are produced when the aneurysm presses on nearby cranial nerves or brain tissue or ruptures, causing subarachnoid hemorrhage. Prognosis depends on the age and neurologic condition of the patient, associated diseases, and the extent and location of the aneurysm.

Clinical Manifestations

- Neurologic deficits (similar to those of ischemic stroke)
- Rupture of the aneurysm causes sudden, unusually severe headache; often, loss of consciousness for a variable period; pain and rigidity of the back of the neck and spine; and visual disturbances (visual loss, diplopia, ptosis). Tinnitus, dizziness, and hemiparesis may also occur.

- If the aneurysm leaks blood and forms a clot, patient may show little neurologic deficit or may have severe bleeding, resulting in cerebral damage followed rapidly by coma and death.

Assessment and Diagnostic Methods

CT scan or MRI, cerebral angiography, and lumbar puncture are diagnostic procedures used to confirm an aneurysm.

Medical Management

- Allow the brain to recover from the initial insult (bleeding).
- Prevent or minimize the risk of rebleeding.
- Prevent or treat other complications: rebleeding, cerebral vasospasm, acute hydrocephalus, and seizures.
- Provide bed rest with sedation to prevent agitation and stress.
- Manage vasospasm with calcium channel blockers, such as nimodipine (Nimotop). Endovascular techniques may also be used.
- Administer supplemental oxygen and maintain the hemoglobin and hematocrit at acceptable levels to assist in maintaining tissue oxygenation.
- Institute surgical treatment (arterial bypass) or medical treatment to prevent rebleeding.
- Manage increased intracranial pressure (ICP) by draining the CSF via ventricular catheter drainage.
- Administer mannitol to reduce ICP, and monitor for signs of dehydration and rebound elevation of ICP.
- Administer antifibrinolytic agents to delay or prevent dissolution of the clot if surgery is delayed or contraindicated.
- Manage systemic hypertension with antihypertensive therapy, arterial hemodynamic monitoring, and stool softeners to prevent straining and elevation of blood pressure.

NURSING PROCESS

The Patient with an Intracranial Aneurysm

Assessment

- Perform a complete neurologic assessment: level of consciousness, pupillary reaction (sluggishness), motor and

sensory function, cranial nerve deficits (extraocular eye movements, facial droop, ptosis), speech difficulties, visual disturbance or headache, and nuchal rigidity or other neurologic deficits.

- Document and report neurologic assessment findings, and reassess and report any changes in patient's condition.
- Detect subtle changes, especially altered levels of consciousness (earliest signs of deterioration include mild drowsiness and slight slurring of speech).

Diagnosis

Nursing Diagnoses

- Ineffective tissue perfusion (cerebral) related to bleeding or vasospasm
- Disturbed sensory perception due to the restrictions of aneurysm precautions
- Anxiety due to illness or restrictions of aneurysm precautions

Collaborative Problems/Potential Complications

- Vasospasm
- Seizures
- Hydrocephalus
- Aneurysm rebleeding
- Hyponatremia

Planning and Goals

Patient goals include improved cerebral tissue perfusion, relief of sensory and perceptual deprivation, relief of anxiety, and absence of complications.

Nursing Interventions

Improving Cerebral Tissue Perfusion

- Monitor closely for neurologic deterioration, and maintain a neurologic flow record.
- Check blood pressure, pulse, level of consciousness, pupillary responses, and motor function hourly; monitor respiratory status and report changes immediately.
- Implement aneurysm precautions (immediate and absolute bed rest in a quiet, nonstressful setting; restrict visitors, except for family).
- Elevate the head of bed 15 to 30 degrees or as ordered.

- Avoid any activity that suddenly increases blood pressure or obstructs venous return (eg, Valsalva maneuver, straining), instruct patient to exhale during voiding or defecation to decrease strain, eliminate caffeine, administer all personal care, and minimize external stimuli.
- Apply antiembolism stockings or sequential compression devices. Observe legs for signs and symptoms of deep vein thrombosis tenderness, redness, swelling, warmth, and edema.

Relieving Sensory Deprivation

- Keep sensory stimulation to a minimum.
- Explain restrictions to help reduce patient's sense of isolation.

Relieving Anxiety

- Inform patient of plan of care.
- Provide support and appropriate reassurance to patient and family.

Monitoring and Managing Potential Complications

- Assess for and immediately report signs of possible vasospasm, which may occur several days after surgery or on the initiation of treatment (intensified headaches, decreased level of responsiveness, or evidence of aphasia or partial paralysis). Also administer calcium channel blockers or fluid-volume expanders as prescribed.
- Maintain seizure precautions. Also maintain airway and prevent injury if a seizure occurs. Administer antiseizure medications as prescribed (phenytoin [Dilantin] is medication of choice).
- Monitor for onset of symptoms of hydrocephalus, which may be acute (first 24 hours after hemorrhage), subacute (days later), or delayed (several weeks later). Report symptoms immediately: acute hydrocephalus is characterized by sudden stupor or coma; subacute or delayed is characterized by gradual onset of drowsiness, behavioral changes, and ataxic gait.
- Monitor for and report symptoms of aneurysm rebleeding. Rebleeding occurs most often in the first 2 weeks.

Symptoms include sudden severe headache, nausea, vomiting, decreased level of consciousness, and neurologic deficit. Administer medications as ordered.

- Hyponatremia: monitor laboratory data often because hyponatremia (serum sodium level under 135 mEq/L) affects up to 30% of patients. Report low levels persisting for 24 hours, as syndrome of inappropriate antidiuretic hormone (SIADH) or cerebral salt-wasting syndrome (kidneys cannot conserve sodium) may develop.

Teaching Patients Self-Care

Provide patient and family with information to promote cooperation with the care and required activity restrictions and prepare them for patient's return home. Identify the causes of intracranial hemorrhage, its possible consequences, and the medical or surgical treatments that are implemented. Discuss the importance of interventions taken to prevent and detect complications (eg, aneurysm precautions, close monitoring of patient). As indicated, facilitate transfer to a rehabilitation unit or center.

Continuing Care

Urge patient and family to follow recommendations to prevent further complications and to schedule and keep follow-up appointments. Refer for home care if warranted, and encourage health promotion and screening practices.

Evaluation

Expected Patient Outcomes

- Demonstrates intact neurologic status and normal vital signs and respiratory patterns
- Demonstrates normal sensory perceptions
- Exhibits reduced anxiety level
- Is free of complications

For more information, see Chapter 62 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Angina Pectoris

Angina pectoris is a clinical syndrome characterized by paroxysms of pain or a feeling of pressure in the anterior chest. The cause is insufficient coronary blood flow, resulting in an inadequate supply of oxygen to meet the myocardial demand. Angina is usually a result of atherosclerotic heart disease and is associated with a significant obstruction of a major coronary artery. Factors affecting anginal pain are physical exertion, exposure to cold, eating a heavy meal, or stress or any emotion-provoking situation that increases blood pressure, heart rate, and myocardial workload. Unstable angina is not associated with the above and may occur at rest.

Clinical Manifestations

- Pain varies from a feeling of indigestion to a choking or heavy sensation in the upper chest ranging from discomfort to agonizing pain. The patient with diabetes mellitus may not experience severe pain with angina.
- Angina is accompanied by severe apprehension and a feeling of impending death.
- The pain is usually retrosternal, deep in the chest behind the upper or middle third of the sternum.
- Discomfort is poorly localized and may radiate to the neck, jaw, shoulders, and inner aspect of the upper arms (usually the left arm).
- A feeling of weakness or numbness in the arms, wrists, and hands, as well as shortness of breath, pallor, diaphoresis, dizziness or lightheadedness, and nausea and vomiting, may accompany the pain. Anxiety may occur with angina.
- An important characteristic of anginal pain is that it subsides when the precipitating cause is removed or with nitroglycerin.

Gerontologic Considerations

The elderly person with angina may not exhibit the typical pain profile because of the diminished responses of neurotransmitters that occur with aging. Often, the presenting symptom in the elderly is dyspnea. Sometimes, there are no symptoms (“silent” CAD), making recognition and diagnosis a clinical challenge. Elderly patients should be encouraged to

recognize their chest pain–like symptom (eg, weakness) as an indication that they should rest or take prescribed medications.

Assessment and Diagnostic Methods

- Evaluation of clinical manifestations of pain and patient history
- Electrocardiogram changes (12-lead ECG), stress testing, blood tests
- Echocardiogram, nuclear scan, or invasive procedures such as cardiac catheterization and coronary angiography

Medical Management

The objectives of the medical management of angina are to decrease the oxygen demand of the myocardium and to increase the oxygen supply. Medically, these objectives are met through pharmacologic therapy and control of risk factors. Alternatively, reperfusion procedures may be used to restore the blood supply to the myocardium. These include PCI procedures (eg, percutaneous transluminal coronary angioplasty [PTCA], intracoronary stents, and atherectomy) and coronary artery bypass graft (CABG).

Pharmacologic Therapy

- Nitrates, the mainstay of therapy (nitroglycerin)
- Beta-adrenergic blockers (metoprolol and atenolol)
- Calcium channel blockers/calcium ion antagonists (amlodipine and diltiazem)
- Antiplatelet and anticoagulant medications (aspirin, clopidogrel, heparin, glycoprotein [GP] IIb/IIIa agents [abciximab, tirofiban, eptifibatide])
- Oxygen therapy

NURSING PROCESS

The Patient with Angina

Assessment

Gather information about the patient's symptoms and activities, especially those that precede and precipitate attacks of angina pectoris. In addition, assess the

patient's risk factors for CAD, the patient's response to angina, the patient's and family's understanding of the diagnosis, and adherence to the current treatment plan.

Diagnosis

Nursing Diagnoses

- Ineffective cardiac tissue perfusion secondary to CAD as evidenced by chest pain or other prodromal symptoms
- Death anxiety
- Deficient knowledge about underlying disease and methods for avoiding complications
- Noncompliance, ineffective management of therapeutic regimen related to failure to accept necessary lifestyle changes

Collaborative Problems/Potential Complications

Potential complications of angina include ACS and/or MI, dysrhythmias and cardiac arrest, heart failure, and cardiogenic shock.

Planning and Goals

Goals include immediate and appropriate treatment when angina occurs, prevention of angina, reduction of anxiety, awareness of the disease process and understanding of the prescribed care, adherence to the self-care program, and absence of complications.

Nursing Interventions

Treating Angina

- Take immediate action if patient reports pain or if the person's prodromal symptoms suggest anginal ischemia
- Direct the patient to stop all activities and sit or rest in bed in a semi-Fowler's position to reduce the oxygen requirements of the ischemic myocardium.
- Measure vital signs and observe for signs of respiratory distress.
- Administer nitroglycerin sublingually and asses the patient's response (repeat up to three doses).
- Administer oxygen therapy if the patient's respiratory rate is increased or if the oxygen saturation level is decreased.

- If the pain is significant and continues after these interventions, the patient is further evaluated for acute MI and may be transferred to a higher-acuity nursing unit.

Reducing Anxiety

- Explore implications that the diagnosis has for patient.
- Provide essential information about the illness and methods of preventing progression. Explain importance of following prescribed directives for the ambulatory patient at home.
- Explore various stress reduction methods with patient (eg, music therapy).

Preventing Pain

- Review the assessment findings, identify the level of activity that causes the patient's pain or prodromal symptoms, and plan the patient's activities accordingly (Box A-1).
- If the patient has pain frequently or with minimal activity, alternate the patient's activities with rest periods. Balancing activity and rest is an important aspect of the educational plan for the patient and family.

Teaching Patients Self-Care

- The teaching program for the patient with angina is designed so that the patient and family understand the illness, identify the symptoms of myocardial ischemia, state the actions to take when symptoms develop, and discuss methods to prevent chest pain and the advancement of CAD.
- The goals of education are to reduce the frequency and severity of anginal attacks, to delay the progress of the

BOX A-1 ***Factors that Trigger Angina Episodes***

- Sudden or excessive exertion
- Exposure to cold
- Tobacco use
- Heavy meals
- Excessive weight
- Some over-the-counter drugs, such as diet pills, nasal decongestants, or drugs that increase heart rate and blood pressure

underlying disease if possible, and to prevent complications.
- Collaborate on a self-care program with patient, family, or friends.
- Plan activities to minimize angina episodes.
- Teach patient that any pain unrelieved within 15 minutes by the usual methods, including nitroglycerin, should be treated at the closest emergency center. Patient should call 911 for assistance.

Evaluation

Expected Patient Outcomes

- Reports that pain is relieved promptly
- Reports decreased anxiety
- Understands ways to avoid complications and demonstrates freedom from complications
- Complies with self-care program

For more information, see Chapter 28 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Aortic Insufficiency (Regurgitation)

Aortic regurgitation is the flow of blood back into the left ventricle from the aorta during diastole. It may be caused by inflammatory lesions that deform the leaflets of the aortic valve, preventing them from completely closing the aortic valve orifice, or result from infective or rheumatic endocarditis, congenital abnormalities, diseases such as syphilis, a dissecting aneurysm that causes dilation or tearing of the ascending aorta, blunt chest trauma, or deterioration of an aortic valve replacement. In many cases, the cause is unknown and is classified as idiopathic.

Clinical Manifestations

- Develops without symptoms in most patients
- Earliest manifestation: increased force of heartbeat—that is, visible or palpable pulsations over the temporal arteries (head) and at the neck (carotid)

- Exertional dyspnea and fatigue
- Signs and symptoms of progressive left ventricular failure (orthopnea, paroxysmal nocturnal dyspnea)
- Widened pulse pressure
- Water-hammer (Corrigan's) pulse (pulse strikes the palpating finger with quick, sharp strokes and then suddenly collapses)

Assessment and Diagnostic Methods

The diagnosis may be confirmed by Doppler echocardiography (preferably transesophageal), radionuclide imaging, ECG, MRI, and cardiac catheterization.

Medical and Surgical Management

- Advise patient to avoid physical exertion, competitive sports, and isometric exercise.
- Treat dysrhythmias and heart failure.
- Medications usually prescribed first for patients with symptoms of aortic regurgitation are vasodilators such as calcium channel blockers (eg, nifedipine [Adalat, Procardia]) and ACE inhibitors (eg, captopril [Capoten], enalapril [Vasotec], lisinopril [Prinivil, Zestril], ramipril [Altace]) or hydralazine (Apresoline).
- The treatment of choice is aortic valvuloplasty or valve replacement, preferably performed before left ventricular failure occurs. Surgery is recommended for any patient with left ventricular hypertrophy, regardless of the presence or absence of symptoms.

Nursing Management

See "Preoperative and Postoperative Nursing Management" in Chapter P for additional information.

- Teach patient about wound care, diet, activity, medication, and self-care.
- Instruct patient on importance of antibiotic prophylaxis to prevent endocarditis.
- Reinforce all new information and self-care instructions for 4 to 8 weeks after the procedure.

For more information, see Chapter 29 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Aortic Stenosis

Aortic valve stenosis is the narrowing of the orifice between the left ventricle and the aorta. In adults, the stenosis is often a result of degenerative calcifications, or it may be a result of rheumatic endocarditis or cusp calcification of unknown cause. There is progressive narrowing of the valve orifice over a period of several years to several decades. The heart muscle increases in size (hypertrophy) in response to all degrees of obstruction; clinical signs of heart failure occur when compensatory mechanisms of the heart fail.

Clinical Manifestations

- Exertional dyspnea
- Orthopnea, paroxysmal nocturnal dyspnea (PND), and pulmonary edema
- Dizziness and syncope (fainting)
- Angina pectoris
- Blood pressure possibly low but usually normal
- Low pulse pressure (30 mm Hg or less)
- Physical examination: loud, rough, systolic murmur heard over the aortic area; vibration over the base of the heart

Assessment and Diagnostic Methods

- 12-lead ECG and echocardiogram
- Left-sided heart catheterization

Medical and Surgical Management

Medications are prescribed to treat dysrhythmia or left ventricular failure. Definitive treatment for aortic stenosis is surgical replacement of the aortic valve. Patients who are symptomatic and are not surgical candidates may benefit from one- or two-balloon percutaneous valvuloplasty procedures.

Nursing Management

See "Preoperative and Postoperative Nursing Management" for additional information.

For more information, see Chapter 29 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Appendicitis

The appendix is a small, finger-like appendage attached to the cecum just below the ileocecal valve. Because it empties into the colon inefficiently and its lumen is small, it is prone to becoming obstructed and is vulnerable to infection (appendicitis). The obstructed appendix becomes inflamed and edematous and eventually fills with pus. It is the most common cause of acute inflammation in the right lower quadrant of the abdominal cavity and the most common cause of emergency abdominal surgery. Although it can occur at any age, it more commonly occurs between the ages of 10 and 30 years.

Clinical Manifestations

- Lower right quadrant pain usually accompanied by low-grade fever, nausea, and sometimes vomiting; loss of appetite is common; constipation can occur.
- At McBurney's point (located halfway between the umbilicus and the anterior spine of the ilium), local tenderness with pressure and some rigidity of the lower portion of the right rectus muscle.
- Rebound tenderness may be present; location of appendix dictates amount of tenderness, muscle spasm, and occurrence of constipation or diarrhea.
- Rovsing's sign (elicited by palpating left lower quadrant, which paradoxically causes pain in right lower quadrant).
- If appendix ruptures, pain becomes more diffuse; abdominal distention develops from paralytic ileus, and condition worsens.

Assessment and Diagnostic Findings

- Diagnosis is based on a complete physical examination and laboratory and imaging tests.
- Elevated WBC count with an elevation of the neutrophils; abdominal radiographs, ultrasound studies, and CT scans may reveal right lower quadrant density or localized distention of the bowel.

Gerontologic Considerations

In the elderly, signs and symptoms of appendicitis may vary greatly. Signs may be very vague and suggestive of bowel obstruction or another process; some patients may experience no symptoms until the appendix ruptures. The incidence of perforated appendix is higher in the elderly because many of these people do not seek health care as quickly as younger people.

Medical Management

- Surgery (conventional or laparoscopic) is indicated if appendicitis is diagnosed and should be performed as soon as possible to decrease risk of perforation.
- Administer antibiotics and IV fluids until surgery is performed.
- Analgesic agents can be given after diagnosis is made.

Complications of Appendectomy

- The major complication is perforation of the appendix, which can lead to peritonitis, abscess formation (collection of purulent material), or portal pylephlebitis.
- Perforation generally occurs 24 hours after the onset of pain. Symptoms include a fever of 37.7°C (100°F) or greater, a toxic appearance, and continued abdominal pain or tenderness.

Nursing Management

- Nursing goals include relieving pain, preventing fluid volume deficit, reducing anxiety, eliminating infection due to the potential or actual disruption of the GI tract, maintaining skin integrity, and attaining optimal nutrition.
- Preoperatively, prepare patient for surgery, start IV line, administer antibiotic, and insert nasogastric tube (if evidence of paralytic ileus). Do not administer an enema or laxative (could cause perforation).
- Postoperatively, place patient in high Fowler's position, give narcotic analgesic as ordered, administer oral fluids when tolerated, give food as desired on day of surgery (if tolerated). If dehydrated before surgery, administer IV fluids.

- If a drain is left in place at the area of the incision, monitor carefully for signs of intestinal obstruction, secondary hemorrhage, or secondary abscesses (eg, fever, tachycardia, and increased leukocyte count).

Promoting Home- and Community-Based Care

Teaching Patients Self-Care

- Teach patient and family to care for the wound and perform dressing changes and irrigations as prescribed.
- Reinforce need for follow-up appointment with surgeon.
- Discuss incision care and activity guidelines.
- Refer for home care nursing as indicated to assist with care and continued monitoring of complications and wound healing.

For more information, see Chapter 38 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Arterial Embolism and Arterial Thrombosis

An arterial embolus is a vascular occlusion. It arises most commonly from thrombi that develop in the chambers of the heart as a result of atrial fibrillation, MI, infective endocarditis, or chronic heart failure.

Arterial thrombosis is a slowly developing clot in a degenerated vessel that can itself occlude an artery. Thrombi also become detached and are carried from the left side of the heart into the arterial system, where they cause obstruction. The immediate effect is cessation of distal blood flow. Secondary vasospasm can contribute to ischemia. Emboli tend to lodge at arterial bifurcations and areas of atherosclerotic narrowing (cerebral, mesenteric, renal, and coronary arteries). Acute thrombosis frequently occurs in patients with preexisting ischemic symptoms.

Clinical Manifestations

The symptoms of arterial emboli depend primarily on the size of the embolus, the organ involved, and the state of the collateral vessels.

- Symptoms can generally be described as the six "P"s: pain, pallor, pulselessness, paresthesia, poikilothermia (coldness), and paralysis.
- The part of the limb below the occlusion is markedly colder and paler than the part above as a result of ischemia.

Assessment and Diagnostic Methods

- Sudden or acute onset of symptoms and apparent source for the embolus is diagnostic.
- Two-dimensional transthoracic echocardiography or TEE, chest x-ray, and ECG may reveal underlying cardiac disease.
- Noninvasive duplex and Doppler ultrasonography can determine the presence and extent of underlying atherosclerosis, and arteriography may be performed.

Medical Management

- In cases of acute embolic occlusion, heparin therapy is initiated immediately, followed by emergency embolectomy as the surgical procedure of choice only if the involved extremity is viable. Percutaneous thrombectomy devices, which require inserting a catheter into the obstructed artery, may also be used.
- When collateral circulation is affected, the anticoagulant heparin is administered intravenously. Intra-arterial thrombolytic therapy may be administered with agents such as streptokinase, reteplase, staphylokinase, or urokinase and others. Contraindications to peripheral thrombolytic therapy include active internal bleeding, cerebrovascular hemorrhage, recent major surgery, uncontrolled hypertension, and pregnancy.

Nursing Management

- Encourage movement of the leg to stimulate circulation and prevent stasis.
- Continue anticoagulants to prevent thrombosis of the affected artery and to diminish development of subsequent thrombi.

- Assess surgical incision frequently for potential hemorrhage.
- Assess pulses, Doppler signals, ankle-brachial index (ABI), and motor and sensory function every hour for the first 24 hours, because significant changes may indicate reocclusion.

For more information, see Chapter 31 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Arteriosclerosis and Atherosclerosis

Arteriosclerosis, or "hardening of the arteries," is the most common disease of the arteries. It is a diffuse process whereby the muscle fibers and the endothelial lining of the walls of small arteries and arterioles become thickened.

Atherosclerosis primarily affects the intima of the large and medium-sized arteries, causing changes that include the accumulation of lipids (atheromas), calcium, blood components, carbohydrates, and fibrous tissue on the intimal layer of the artery. Although the pathologic processes of arteriosclerosis and atherosclerosis differ, rarely does one occur without the other, and the terms often are used interchangeably. The most common direct results of atherosclerosis in the arteries include narrowing (stenosis) of the lumen and obstruction by thrombosis, aneurysm, ulceration, and rupture; ischemia and necrosis occur if the supply of blood, nutrients, and oxygen is severely and permanently disrupted.

Atherosclerosis can develop anywhere in the body but is most common in bifurcation or branch areas of blood vessels. Atherosclerotic lesions are of two types: fatty streaks (composed of lipids and elongated smooth muscle cells) and fibrous plaques (predominantly found in the abdominal aorta and coronary, popliteal, and internal carotid arteries).

Risk Factors

Many risk factors are associated with atherosclerosis; the greater the number of risk factors, the greater the likelihood of developing the disease.

- The use of tobacco products (strongest risk factor)
- High fat intake (suspected risk factor, along with high serum cholesterol and blood lipid levels)
- Hypertension
- Diabetes
- Obesity, stress, and lack of exercise
- Elevated C-reactive protein

Clinical Manifestations

Clinical features depend on the tissue or organ affected: heart (angina and MI due to coronary atherosclerosis), brain (transient ischemic attacks and stroke due to cerebrovascular disease), peripheral vessels (includes hypertension and symptoms of aneurysm of the aorta, renovascular disease, atherosclerotic lesions of the extremities). See specific condition for greater detail.

Management

The management of atherosclerosis involves modification of risk factors, a controlled exercise program to improve circulation and its functioning capacity, medication therapy, and interventional or surgical graft procedures (inflow or outflow procedures).

Several radiologic techniques are important adjunctive therapies to surgical procedures. They include arteriography, percutaneous transluminal angioplasty, and stents and stent grafts.

For more information, see Chapter 31 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Arthritis, Rheumatoid

Rheumatoid arthritis (RA) is an inflammatory disorder of unknown origin that primarily involves the synovial membrane of the joints. Phagocytosis produces enzymes within the joint. The enzymes break down collagen, causing edema, proliferation of the synovial membrane, and ultimately pannus

formation. Pannus destroys cartilage and erodes the bone. The consequence is loss of articular surfaces and joint motion. Muscle fibers undergo degenerative changes. Tendon and ligament elasticity and contractile power are lost. RA affects 1% of the population worldwide, affecting women two to four times more often than men.

Clinical Manifestations

Clinical features are determined by the stage and severity of the disease.

- Joint pain, swelling, warmth, erythema, and lack of function are classic symptoms.
- Palpation of joints reveals spongy or boggy tissue.
- Fluid can usually be aspirated from the inflamed joint.

Characteristic Pattern of Joint Involvement

- Begins with small joints in hands, wrists, and feet.
- Progressively involves knees, shoulders, hips, elbows, ankles, cervical spine, and temporomandibular joints.
- Symptoms are usually acute in onset, bilateral, and symmetric.
- Joints may be hot, swollen, and painful; joint stiffness often occurs in the morning.
- Deformities of the hands and feet can result from misalignment and immobilization.

Extraarticular Features

- Fever, weight loss, fatigue, anemia, sensory changes, and lymph node enlargement
- Raynaud's phenomenon (cold- and stress-induced vasospasm)
- Rheumatoid nodules, nontender and movable; found in subcutaneous tissue over bony prominences
- Arteritis, neuropathy, scleritis, pericarditis, splenomegaly, and Sjögren syndrome (dry eyes and mucous membranes)

Assessment and Diagnostic Methods

- Several factors contribute to an RA diagnosis: rheumatoid nodules, joint inflammation detected on palpation, laboratory findings, extra-articular changes.
- Rheumatoid factor is present in about three fourths of patients.

- RBC count and C4 complement component are decreased; erythrocyte sedimentation rate is elevated.
- C-reactive protein and antinuclear antibody test results may be positive.
- Arthrocentesis and x-rays may be performed.

Medical Management

Treatment begins with education, a balance of rest and exercise, and referral to community agencies for support.

- Early RA: medication management involves therapeutic doses of salicylates or NSAIDs; includes new COX-2 enzyme blockers, antimalarials, gold, penicillamine, or sulfasalazine; methotrexate; biologic response modifiers and tumor necrosis factor-alpha (TNF-α) inhibitors are helpful; analgesic agents for periods of extreme pain.
- Moderate, erosive RA: formal program of occupational and physical therapy; an immunosuppressant such as cyclosporine may be added.
- Persistent, erosive RA: reconstructive surgery and corticosteroids.
- Advanced unremitting RA: immunosuppressive agents such as methotrexate, cyclophosphamide, azathioprine, and leflunomide (highly toxic, can cause bone marrow suppression, anemia, GI tract disturbances, and rashes). Also promising for refractory RA is a Food and Drug Administration (FDA)–approved apheresis device: a protein A immunoadsorption column (Prosorba) that binds circulating immune system complex (IgG).
- RA patients frequently experience anorexia, weight loss, and anemia, requiring careful dietary history to identify usual eating habits and food preferences. Corticosteroids may stimulate appetite and cause weight gain.
- Low-dose antidepressant medications (amitriptyline) are used to reestablish adequate sleep pattern and manage pain.

Nursing Management

The most common issues for the patient with RA include pain, sleep disturbance, fatigue, altered mood, and limited

mobility. The patient with newly diagnosed RA needs information about the disease to make daily self-management decisions and to cope with having a chronic disease.

Relieving Pain and Discomfort

- Provide a variety of comfort measures (eg, application of heat or cold; massage, position changes, rest; foam mattress, supportive pillow, splints; relaxation techniques, diversional activities).
- Administer anti-inflammatory, analgesic, and slow-acting antirheumatic medications as prescribed.
- Individualize medication schedule to meet patient's need for pain management.
- Encourage verbalization of feelings about pain and chronicity of disease.
- Teach pathophysiology of pain and rheumatic disease, and assist patient to recognize that pain often leads to unproven treatment methods.
- Assist in identification of pain that leads to use of unproven methods of treatment.
- Assess for subjective changes in pain.

Reducing Fatigue

- Provide instruction about fatigue: Describe relationship of disease activity to fatigue; describe comfort measures while providing them; develop and encourage a sleep routine (warm bath and relaxation techniques that promote sleep); explain importance of rest for relieving systematic, articular, and emotional stress.
- Explain how to use energy conservation techniques (pacing, delegating, setting priorities).
- Identify physical and emotional factors that can cause fatigue.
- Facilitate development of appropriate activity/rest schedule.
- Encourage adherence to the treatment program.
- Refer to and encourage a conditioning program.
- Encourage adequate nutrition, including source of iron from food and supplements.

Increasing Mobility

- Encourage verbalization regarding limitations in mobility.
- Assess need for occupational or physical therapy consultation: Emphasize range of motion of affected joints; promote

use of assistive ambulatory devices; explain use of safe footwear; use individual appropriate positioning/posture.

- Assist to identify environmental barriers.
- Encourage independence in mobility and assist as needed: Allow ample time for activity; provide rest period after activity; reinforce principles of joint protection and work simplification.
- Initiate referral to community health agency.

Facilitating Self-Care

- Assist patient to identify self-care deficits and factors that interfere with ability to perform self-care activities.
- Develop a plan based on the patient's perceptions and priorities on how to establish and achieve goals to meet self-care needs, incorporating joint protection, energy conservation, and work simplification concepts: Provide appropriate assistive devices; reinforce correct and safe use of assistive devices; allow patient to control timing of self-care activities; explore with the patient different ways to perform difficult tasks or ways to enlist the help of someone else.
- Consult with community health care agencies when individuals have attained a maximum level of self-care yet still have some deficits, especially regarding safety.

Improving Body Image and Coping Skills

- Help patient identify elements of control over disease symptoms and treatment.
- Encourage patient's verbalization of feelings, perceptions, and fears.
- Identify areas of life affected by disease. Answer questions and dispel possible myths.
- Develop plan for managing symptoms and enlisting support of family and friends to promote daily function.

Monitoring and Managing Potential Complications

- Help patient recognize and deal with side effects from medications.
- Monitor for medication side effects, including GI tract bleeding or irritation, bone marrow suppression, kidney or liver toxicity, increased incidence of infection, mouth sores, rashes, and changes in vision. Other signs and symptoms

include bruising, breathing problems, dizziness, jaundice, dark urine, black or bloody stools, diarrhea, nausea and vomiting, and headaches.

- Monitor closely for systemic and local infections, which often can be masked by high doses of corticosteroids.

Promoting Home- and Community-Based Care

Teaching Patients Self-Care

- Focus patient teaching on the disease, possible changes related to it, the prescribed therapeutic regimen, side effects of medications, strategies to maintain independence and function, and safety in the home.
- Encourage patient and family to verbalize their concerns and ask questions.
- Address pain, fatigue, and depression before initiating a teaching program, because they can interfere with patient's ability to learn.
- Instruct patient about basic disease management and necessary adaptations in lifestyle.

Continuing Care

- Refer for home care as warranted (eg, frail patient with significantly limited function).
- Assess the home environment and its adequacy for patient safety and management of the disorder.
- Identify any barriers to compliance, and make appropriate referrals.
- For patients at risk for impaired skin integrity, monitor skin status and also instruct, provide, or supervise the patient and family in preventive skin care measures.
- Assess patient's need for assistance in the home, and supervise home health aides.
- Make referrals to physical and occupational therapists as problems are identified and limitations increase.
- Alert patient and family to support services such as Meals on Wheels and local Arthritis Foundation chapters.
- Assess the patient's physical and psychological status, adequacy of symptom management, and adherence to the management plan.

- Emphasize the importance of follow-up appointments to the patient and family.

For more information, see Chapter 54 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Asthma

Asthma is a chronic inflammatory disease of the airways characterized by hyperresponsiveness, mucosal edema, and mucus production. This inflammation ultimately leads to recurrent episodes of asthma symptoms: cough, chest tightness, wheezing, and dyspnea. Patients with asthma may experience symptom-free periods alternating with acute exacerbations that last from minutes to hours or days.

Asthma, the most common chronic disease of childhood, can begin at any age. Risk factors for asthma include family history, allergy (strongest factor), and chronic exposure to airway irritants or allergens (eg, grass, weed pollens, mold, dust, or animals). Common triggers for asthma symptoms and exacerbations include airway irritants (eg, pollutants, cold, heat, strong odors, smoke, perfumes), exercise, stress or emotional upset, rhinosinusitis with postnasal drip, medications, viral respiratory tract infections, and gastroesophageal reflux.

Clinical Manifestations

- Most common symptoms of asthma are cough (with or without mucus production), dyspnea, and wheezing (first on expiration, then possibly during inspiration as well).
- Asthma attacks frequently occur at night or in the early morning.
- An asthma exacerbation is frequently preceded by increasing symptoms over days, but it may begin abruptly.
- Chest tightness and dyspnea occur.
- Expiration requires effort and becomes prolonged.
- As exacerbation progresses, central cyanosis secondary to severe hypoxia may occur.
- Additional symptoms, such as diaphoresis, tachycardia, and a widened pulse pressure, may occur.

- Exercise-induced asthma: maximal symptoms during exercise, absence of nocturnal symptoms, and sometimes only a description of a “choking” sensation during exercise.
- A severe, continuous reaction, status asthmaticus, may occur. It is life-threatening.
- Eczema, rashes, and temporary edema are allergic reactions that may be noted with asthma.

Assessment and Diagnostic Methods

- Family, environment, and occupational history is essential.
- During acute episodes, sputum and blood test, pulse oximetry, ABGs, hypocapnia and respiratory alkalosis, and pulmonary function (forced expiratory volume [FEV] and forced vital capacity [FVC] decreased) tests are performed.

Medical Management

Pharmacologic Therapy

There are two classes of medications—long-acting control and quick-relief medications—as well as combination products.

- Short-acting $beta_2$-adrenergic agonists
- Anticholinergics
- Corticosteroids: metered-dose inhaler (MDI)
- Leukotriene modifiers inhibitors/antileukotrienes
- Methylxanthines

Nursing Management

The immediate nursing care of patients with asthma depends on the severity of symptoms. The patient and family are often frightened and anxious because of the patient’s dyspnea. Therefore, a calm approach is an important aspect of care.

- Assess the patient’s respiratory status by monitoring the severity of symptoms, breath sounds, peak flow, pulse oximetry, and vital signs.
- Obtain a history of allergic reactions to medications before administering medications.
- Identify medications the patient is currently taking.
- Administer medications as prescribed and monitor the patient’s responses to those medications; medications may

include an antibiotic if the patient has an underlying respiratory infection.
- Administer fluids if the patient is dehydrated.
- Assist with intubation procedure, if required.

Promoting Home- and Community-Based Care

Teaching Patients Self-Care

- Teach patient and family about asthma (chronic inflammatory), purpose and action of medications, triggers to avoid and how to do so, and proper inhalation technique.
- Instruct patient and family about peak-flow monitoring.
- Teach patient how to implement an action plan and how and when to seek assistance.
- Obtain current educational materials for the patient based on the patient's diagnosis, causative factors, educational level, and cultural background.

Continuing Care

- Emphasize adherence to prescribed therapy, preventive measures, and need for follow-up appointments.
- Refer for home health nurse as indicated.
- Home visit to assess for allergens may be indicated (with recurrent exacerbations).
- Refer patient to community support groups.
- Remind patients and families about the importance of health promotion strategies and recommended health screening.

For more information, see Chapter 24 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Asthma: Status Asthmaticus

Status asthmaticus is severe and persistent asthma that does not respond to conventional therapy; attacks can occur with little or no warning and can progress rapidly to asphyxiation. Infection, anxiety, nebulizer abuse, dehydration, increased adrenergic blockage, and nonspecific irritants may contribute to these episodes. An acute episode may be precipitated by hypersensitivity to

aspirin. Two predominant pathologic problems occur: a decrease in bronchial diameter and a ventilation–perfusion abnormality.

Clinical Manifestations

- Same as those in severe asthma.
- No correlation between severity of attack and number of wheezes; with greater obstruction, wheezing may disappear, possibly signaling impending respiratory failure.

Assessment and Diagnostic Findings

- Primarily pulmonary function studies and ABG analysis
- Respiratory alkalosis most common finding

NURSING ALERT

Rising $PaCO_2$ to normal or higher is a danger sign, signaling respiratory failure.

Medical Management

- Initial treatment: beta$_2$-adrenergic agonists, corticosteroids, supplemental oxygen and IV fluids to hydrate patient. Sedatives are contraindicated.
- High-flow supplemental oxygen is best delivered using a partial or complete non-rebreather mask (PaO_2 at a minimum of 92 mm Hg or O_2 saturation greater than 95%).
- Magnesium sulfate, a calcium antagonist, may be administered to induce smooth muscle relaxation.
- Hospitalization if no response to repeated treatments or if blood gas levels deteriorate or pulmonary function scores are low.
- Mechanical ventilation if patient is tiring or in respiratory failure or if condition does not respond to treatment.

Nursing Management

The main focus of nursing management is to actively assess the airway and the patient's response to treatment. The nurse should be prepared for the next intervention if the patient does not respond to treatment.

- Constantly monitor the patient for the first 12 to 24 hours, or until status asthmaticus is under control. Blood pressure

and cardiac rhythm should be monitored continuously during the acute phase and until the patient stabilizes and responds to therapy.

- Assess the patient's skin turgor for signs of dehydration; fluid intake is essential to combat dehydration, to loosen secretions, and to facilitate expectoration.
- Administer IV fluids as prescribed, up to 3 to 4 L/day, unless contraindicated.
- Encourage the patient to conserve energy.
- Ensure patient's room is quiet and free of respiratory irritants (eg, flowers, tobacco smoke, perfumes, or odors of cleaning agents); nonallergenic pillows should be used.

For more information, see Chapter 24 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.



B

Back Pain, Low

Most low back pain is caused by one of many musculoskeletal problems, including acute lumbosacral strain, unstable lumbosacral ligaments and weak muscles, osteoarthritis of the spine, spinal stenosis, intervertebral disk problems, and unequal leg length. Obesity, postural problems, structural problems, stress, overstretching of the spinal supports, and occasionally depression may also result in back pain. Back pain due to musculoskeletal disorders usually is aggravated by activity, whereas pain due to other conditions is not. Older patients may experience back pain associated with osteoporotic vertebral fractures, osteoarthritis of the spine, spinal stenosis, and spondylolisthesis, among other conditions.

Clinical Manifestations

- Acute or chronic back pain (lasting more than 3 months without improvement) and fatigue.
- Pain that radiates down the leg (radiculopathy, sciatica); presence of this symptom suggests nerve root involvement.
- Gait, spinal mobility, reflexes, leg length, leg motor strength, and sensory perception may be affected.
- Paravertebral muscle spasm (greatly increased muscle tone of back postural muscles) occurs with loss of normal lumbar curve and possible spinal deformity.

Assessment and Diagnostic Methods

- Health history and physical examination (back examination, neurologic testing)
- Spinal x-ray
- Bone scan and blood studies
- Computed tomography (CT) scan
- Magnetic resonance imaging (MRI)
- Electromyogram and nerve conduction studies

- Myelogram
- Ultrasound

Medical Management

Most back pain is self-limited and resolves within 4 weeks with analgesics, rest, and relaxation. Management focuses on relief of pain and discomfort, activity modification, and patient education. Bed rest is recommended for 1 to 2 days, for a maximum of 4 days and *only* if pain is severe. Other effective nonpharmacologic interventions include the application of superficial heat and spinal manipulation. Cognitive-behavioral therapy (eg, biofeedback), exercise regimens, spinal manipulation, physical therapy, acupuncture, massage, and yoga are all effective nonpharmacologic interventions for treating chronic low back pain but not acute low back pain. Most patients need to alter their activity patterns to avoid aggravating the pain. They should avoid twisting, bending, lifting, and reaching, all of which stress the back. A gradual return to activities and a program of low-stress aerobic exercise are recommended.

Pharmacologic Therapy

- Acute low back pain: nonprescription analgesics (eg, acetaminophen [Tylenol]), nonsteroidal anti-inflammatory drugs (NSAIDs) (eg, ibuprofen [Motrin]), and prescription muscle relaxants (eg, cyclobenzaprine [Flexeril])
- Chronic low back pain: tricyclic antidepressants (eg, amitriptyline [Elavil)
- Others: opioids (eg, morphine), tramadol (Ultram), benzodiazepines (eg, diazepam [Valium]), and gabapentin (Neurontin) (ie, prescribed for pain from radiculopathy)

Nursing Management

Assessment

- Encourage patient to describe the discomfort (location, severity, duration, characteristics, radiation, associated weakness in the legs).
- Obtain history of pain origin, previous pain control, and how back problem is affecting lifestyle; assess environmental variables, work situations, and family relationships.

- Observe patient's posture, position changes, and gait.
- Assess spinal curves, pelvic crest, leg length discrepancy, and shoulder symmetry.
- Palpate paraspinal muscles and note spasm and tenderness.
- Note discomfort and limitations in movement when patient bends forward and laterally.
- Evaluate nerve involvement by assessing deep tendon reflexes, sensations, and muscle strength; back and leg pain on straight-leg raising (with the patient in supine position, the patient's leg is lifted upward with the knee extended) suggests nerve root involvement.
- Assess for obesity and perform nutritional assessment.
- Assess patient's response to analgesic agents; evaluate and note patient's response to various pain management modalities.

Interventions

- With severe pain, limit activity for 1 to 2 days.
- Advise patient to rest on a firm, nonsagging mattress.
- Help patient to increase lumbar flexion by elevating the head and thorax 30 degrees using pillows or a foam wedge and slightly flexing the knees supported on a pillow. Alternatively, the patient can assume a lateral position with knees and hips flexed (curled position) with a pillow between the knees and legs and a pillow supporting the head.
- Instruct the patient to get out of bed by rolling to one side and placing the legs down while pushing the torso up, keeping the back straight.
- As the patient achieves comfort, help patient gradually resume activities, and initiate an exercise program; begin with low-stress aerobic exercises then after 2 weeks, begin conditioning exercises; each exercise period should begin with relaxation.
- Encourage patient to adhere to the prescribed exercise program.
- Encourage patient to improve posture and use good body mechanics and to avoid excessive lumbar strain, twisting, or discomfort (eg, avoid activities such as horseback riding and weight lifting).

B

- Teach patient how to stand, sit, lie, and lift properly:
  - Shift weight frequently when standing and rest one foot on a low stool; wear low heels.
  - Sit with knees and hips flexed and knees level with hips or higher. Keep feet flat on the floor. Avoid sitting on stools or chairs that do not provide firm back support.
  - Sleep on side with knees and hips flexed or supine with knees flexed and supported; avoid sleeping prone.
  - Lift objects using thigh muscles, not back. Place feet hip-width apart for a wide base of support, bend the knees, tighten the abdominal muscles, and lift the object close to the body with a smooth motion. Avoid twisting and jarring motions.
- Assist patient resume former role-related responsibilities when appropriate.
- Refer patient to psychotherapy or counseling, if needed.
- If patient is obese, assist with weight reduction through diet modification; note achievement, and provide encouragement and positive reinforcement to facilitate adherence.

For more information, see Chapter 68 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Bell's Palsy

Bell's palsy (facial paralysis) is due to peripheral involvement of the seventh cranial nerve on one side, which results in weakness or paralysis of the facial muscles. The cause is unknown, but possible causes may include vascular ischemia, viral disease (herpes simplex, herpes zoster), autoimmune disease, or a combination. Bell's palsy may represent a type of pressure paralysis in which ischemic necrosis of the facial nerve causes a distortion of the face, increased lacrimation (tearing), and painful sensations in the face, behind the ear, and in the eye. The patient may experience speech difficulties and may be unable to eat on the affected side owing to

weakness. Most patients recover completely, and Bell's palsy rarely recurs.

Medical Management

The objectives of management are to maintain facial muscle tone and to prevent or minimize denervation. Corticosteroid therapy (prednisone) may be initiated to reduce inflammation and edema, which reduces vascular compression and permits restoration of blood circulation to the nerve. Early administration of corticosteroids appears to diminish severity, relieve pain, and minimize denervation. Facial pain is controlled with analgesic agents or heat applied to the involved side of the face. Additional modalities may include electrical stimulation applied to the face to prevent muscle atrophy, or surgical exploration of the facial nerve. Surgery may be performed if a tumor is suspected, for surgical decompression of the facial nerve, and for surgical rehabilitation of a paralyzed face.

Nursing Management

Patients need reassurance that a stroke has not occurred and that spontaneous recovery occurs within 3 to 5 weeks in most patients. Teaching patients with Bell's palsy to care for themselves at home is an important nursing priority.

Teaching Eye Care

Because the eye usually does not close completely, the blink reflex is diminished, so the eye is vulnerable to injury from dust and foreign particles. Corneal irritation and ulceration may occur. Distortion of the lower lid alters the proper drainage of tears. Key teaching points include the following:

- Cover the eye with a protective shield at night.
- Apply eye ointment to keep eyelids closed during sleep.
- Close the paralyzed eyelid manually before going to sleep.
- Wear wraparound sunglasses or goggles to decrease normal evaporation from the eye.

Teaching About Maintaining Muscle Tone

- Show patient how to perform facial massage with gentle upward motion several times daily when the patient can tolerate the massage.

- Demonstrate facial exercises, such as wrinkling the forehead, blowing out the cheeks, and whistling, in an effort to prevent muscle atrophy.
- Instruct patient to avoid exposing the face to cold and drafts.

For more information, see Chapter 64 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Benign Prostatic Hyperplasia and Prostatectomy

Benign prostatic hyperplasia (BPH) is enlargement, or hypertrophy, of the prostate gland. The prostate gland enlarges, extending upward into the bladder and obstructing the outflow of urine. Incomplete emptying of the bladder and urinary retention leading to urinary stasis may result in hydronephrosis, hydroureter, and urinary tract infections (UTIs). The cause is not well understood, but evidence suggests hormonal involvement. BPH is common in men older than 40 years.

Clinical Manifestations

- The prostate is large, rubbery, and nontender. Prostatism (obstructive and irritative symptom complex) is noted.
- Hesitancy in starting urination, increased frequency of urination, nocturia, urgency, abdominal straining.
- Decrease in volume and force of urinary stream, interruption of urinary stream, dribbling.
- Sensation of incomplete emptying of the bladder, acute urinary retention (more than 60 mL), and recurrent UTIs.
- Fatigue, anorexia, nausea and vomiting, and pelvic discomfort are also reported, and ultimately azotemia and renal failure result with chronic urinary retention and large residual volumes.

Assessment and Diagnostic Methods

- Physical examination, including digital rectal examination (DRE), and health history.
- Urinalysis to screen for hematuria and UTI.

- Prostate-specific antigen (PSA) level is obtained if the patient has at least a 10-year life expectancy and for whom knowledge of the presence of prostate cancer would change management.
- Urinary flow-rate recording and the measurement of postvoid residual (PVR) urine.
- Urodynamic studies, urethrocystoscopy, and ultrasound may be performed.
- Complete blood studies, including clotting studies.

Medical Management

The treatment plan depends on the cause, severity of obstruction, and condition of the patient. Treatment measures include the following:

- Immediate catheterization if patient cannot void (an urologist may be consulted if an ordinary catheter cannot be inserted). A suprapubic cystostomy is sometimes necessary.
- “Watchful waiting” to monitor disease progression.

Pharmacologic Management

- Alpha-adrenergic blockers (eg, alfuzosin, terazosin), which relax the smooth muscle of the bladder neck and prostate, and 5-alpha-reductase inhibitors.
- Hormonal manipulation with antiandrogen agents (finasteride [Proscar]) decreases the size of the prostate and prevents the conversion of testosterone to dihydrotestosterone (DHT).
- Use of phytotherapeutic agents and other dietary supplements (*Serenoa repens* [saw palmetto berry] and *Pygeum africanum* [African plum]) are not recommended, although they are commonly used.

Surgical Management

- Minimally invasive therapy: transurethral microwave heat treatment (TUMT; application of heat to prostatic tissue); transurethral needle ablation (TUNA; via thin needles placed in prostate gland); prostatic stents (but only for patients with urinary retention and in patients who are poor surgical risks)
- Surgical resection: transurethral resection of the prostate (TURP; benchmark for surgical treatment); transurethral incision of the prostate (TUIP); transurethral electrovaporization; laser therapy; and open prostatectomy

Nursing Management

See "Nursing Process: The Patient Undergoing Prostatectomy" under "Cancer of the Prostate" for additional information.

For more information, see Chapter 49 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Bone Tumors

Neoplasms of the musculoskeletal system are of various types, including osteogenic, chondrogenic, fibrogenic, muscle (rhabdomyogenic), and marrow (reticulum) cell tumors as well as nerve, vascular, and fatty cell tumors. They may be primary tumors or metastatic tumors from primary cancers elsewhere in the body (eg, breast, lung, prostate, kidney). Metastatic bone tumors are more common than primary bone tumors.

Types

Benign Bone Tumors

Benign bone tumors are slow growing, well circumscribed, and encapsulated. They produce few symptoms and do not cause death. Benign primary neoplasms of the musculoskeletal system include osteochondroma, enchondroma, bone cyst (eg, aneurysmal bone cyst), osteoid osteoma, rhabdomyoma, and fibroma. Benign tumors of the bone and soft tissue are more common than malignant primary bone tumors.

Osteochondroma, the most common benign bone tumor, may become malignant. Enchondroma is a common tumor of the hyaline cartilage of the hand, femur, tibia, or humerus. Osteoid osteoma is a painful tumor that occurs in children and young adults. Osteoclastomas (giant cell tumors) are benign for long periods but may invade local tissue and cause destruction. These tumors may undergo malignant transformation and metastasize. Bone cysts are expanding lesions within the bone (eg, aneurysmal and unicameral).

Malignant Bone Tumors

Primary malignant musculoskeletal tumors are relatively rare and arise from connective and supportive tissue cells (sarcomas)

or bone marrow elements (myelomas). Malignant primary musculoskeletal tumors include osteosarcoma, chondrosarcoma, Ewing's sarcoma, and fibrosarcoma. Soft tissue sarcomas include liposarcoma, fibrosarcoma, and rhabdomyosarcoma. Metastasis to the lungs is common. Osteogenic sarcoma (osteosarcoma) is the most common and is often fatal owing to metastasis to the lungs. It is seen most frequently in children, adolescents, and young adults (in bones that grow rapidly); in older people with Paget's disease of the bone; and in persons with a prior history of radiation exposure. Common sites are distal femur, the proximal tibia, and the proximal humerus.

Chondrosarcoma, the second most common primary malignant bone tumor, is a large, bulky tumor that may grow and metastasize slowly or very fast, depending upon the characteristics of the tumor cells involved. Tumor sites may include pelvis, femur, humerus, spine, scapula, and tibia. Tumors may recur after treatment.

Metastatic Bone Disease

Metastatic bone disease (secondary bone tumors) is more common than any primary malignant bone tumor. The most common primary sites of tumors that metastasize to bone are the kidney, prostate, lung, breast, ovary, and thyroid. Metastatic tumors most frequently attack the skull, spine, pelvis, femur, and humerus and often involve more than one bone.

Clinical Manifestations

Bone tumors present with a wide range of associated problems:

- Asymptomatic or pain (mild, occasional to constant, severe).
- Varying degrees of disability; at times, obvious bone growth.
- Weight loss, malaise, and fever may be present.
- Spinal metastasis results in cord compression and neurologic deficits (eg, progressive pain, weakness, gait abnormality, paresthesia, paraplegia, urinary retention, loss of bowel or bladder control).

Assessment and Diagnostic Findings

- May be diagnosed incidentally after pathologic fracture
- CT scan, bone scan, myelography, MRI, arteriography, x-ray studies

- Biochemical assays of the blood and urine (alkaline phosphatase levels are frequently elevated with osteogenic sarcoma; serum acid phosphatase levels are elevated with metastatic carcinoma of the prostate; hypercalcemia is present with breast, lung, and kidney cancer bone metastases)
- Surgical biopsy for histologic identification; staging based on tumor size, grade, location, and metastasis

Medical Management

The goal of treatment is to destroy or remove the tumor. This may be accomplished by surgical excision (ranging from local excision to amputation and disarticulation), radiation, or chemotherapy.

- Limb-sparing (salvage) procedures are used to remove the tumor and adjacent tissue; surgical removal of the tumor may, however, require amputation of the affected extremity.
- Chemotherapy is started before and continued after surgery in an effort to eradicate micrometastatic lesions.
- Soft tissue sarcomas are treated with radiation, limb-sparing excision, and adjuvant chemotherapy.
- Metastatic bone cancer treatment is palliative; therapeutic goal is to relieve pain and discomfort as much as possible while promoting quality of life.
- Internal fixation of pathologic fractures, arthroplasty, or methylmethacrylate (bone cement) minimizes associated disability and pain in metastatic disease.

Nursing Management

- Ask the patient about the onset and course of symptoms; assess the patient's understanding of the disease process, how the patient and the family have been coping, and how the patient has managed the pain.
- Gently palpate the mass and note its size and associated soft tissue swelling, pain, and tenderness.
- Assess patient's neurovascular status and range of motion of the extremity to provide baseline data for future comparisons; evaluate the patient's mobility and ability to perform activities of daily living (ADLs).
- Nursing care similar to that of other patients who have had skeletal surgery: Monitor vital signs; assess blood loss; observe

and assess for the development of complications such as deep vein thrombosis (DVT), pulmonary emboli, infection, contracture, and disuse atrophy; elevate affected part to reduce edema; and assess the neurovascular status of the extremity.

- Teach patient and family about the disease process and diagnostic and management regimens; explain diagnostic tests, treatments (eg, wound care), and expected results (eg, decreased range of motion, numbness, change of body contours) to help patient deal with the procedures and changes and comply with the therapeutic regimen.
- Assess pain and provide pharmacologic and nonpharmacologic pain management techniques to relieve pain and increase comfort level; work with the patient to design the most effective pain management regimen.
- Prepare the patient and provide support during painful procedures.
- Prescribe intravenous (IV) or epidural analgesics to be used during the early postoperative period; later, oral or transdermal opioid or nonopioid analgesics are indicated to alleviate pain; external radiation or systemic radioisotopes may be prescribed.
- Support and handle the affected extremities gently; provide external supports (eg, splints) for additional protection.
- Ensure any prescribed weight-bearing restrictions are followed; with help of physical therapist, teach the patient how to use assistive devices safely and how to strengthen unaffected extremities.
- Encourage the patient and family to verbalize their fears, concerns, and feelings; refer to psychiatric advanced practice nurse, psychologist, counselor, or spiritual advisor if necessary.
- Assist the patient in dealing with changes in body image due to surgery and possible amputation; provide realistic reassurance about the future and resumption of role-related activities and encourage self-care and socialization.
- Encourage the patient to be as independent as possible.

For more information, see Chapter 68 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

B

Bowel Obstruction, Large

Intestinal obstruction (mechanical or functional) occurs when blockage prevents the flow of contents through the intestinal tract. Large bowel obstruction results in an accumulation of intestinal contents, fluid, and gas proximal to the obstruction. Obstruction in the colon can lead to severe distention and perforation unless gas and fluid can flow back through the ileal valve. Dehydration occurs more slowly than in small bowel obstruction. If the blood supply is cut off, intestinal strangulation and necrosis occur; this condition is life threatening.

Clinical Manifestations

Symptoms develop and progress relatively slowly.

- Constipation may be the only symptom for months (obstruction in sigmoid colon or rectum).
- Blood loss in the stool, which may result in iron-deficiency anemia.
- The patient may experience weakness, weight loss, and anorexia.
- Abdomen eventually becomes markedly distended, loops of large bowel become visibly outlined through the abdominal wall, and patient has crampy lower abdominal pain.
- Fecal vomiting develops; symptoms of shock may occur.

Assessment and Diagnostic Methods

Symptoms plus imaging studies (abdominal x-ray and abdominal CT scan or MRI; barium studies are contraindicated)

Medical Management

- Restoration of intravascular volume, correction of electrolyte abnormalities, and nasogastric aspiration and decompression are instituted immediately.
- Colonoscopy to untwist and decompress the bowel, if obstruction is high in the colon.
- Cecostomy may be performed for patients who are poor surgical risks and urgently need relief from the obstruction.
- Rectal tube to decompress an area that is lower in the bowel.
- Usual treatment is surgical resection to remove the obstructing lesion; a temporary or permanent colostomy may be

necessary; an ileoanal anastomosis may be performed if entire large bowel must be removed.

Nursing Management

- Monitor symptoms indicating worsening intestinal obstruction.
- Provide emotional support and comfort.
- Administer IV fluids and electrolyte replacement.
- Prepare patient for surgery if no response to medical treatment.
- Provide preoperative teaching as patient's condition indicates.
- After surgery, provide general abdominal wound care and routine postoperative nursing care.

For more information, see Chapter 38 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Bowel Obstruction, Small

Most bowel obstructions occur in the small intestine. Intestinal contents, fluid, and gas accumulate above the intestinal obstruction. The abdominal distention and retention of fluid reduce the absorption of fluids and stimulate more gastric secretion. With increasing distention, pressure within the intestinal lumen increases, causing a decrease in venous and arteriolar capillary pressure. This causes edema, congestion, necrosis, and eventual rupture or perforation of the intestinal wall, with resultant peritonitis. Reflux vomiting may be caused by abdominal distention. Vomiting results in loss of hydrogen ions and potassium from the stomach, leading to reduction of chlorides and potassium in the blood and to metabolic alkalosis. Dehydration and acidosis develop from loss of water and sodium. With acute fluid losses, hypovolemic shock may occur.

Clinical Manifestations

- Initial symptom is usually crampy pain that is wavelike and colicky. Patient may pass blood and mucus but no fecal matter or flatus. Vomiting occurs.

B

- If the obstruction is complete, peristaltic waves become extremely vigorous and assume a reverse direction, propelling intestinal contents toward the mouth.
- If the obstruction is in the ileum, fecal vomiting takes place.
- Dehydration results in intense thirst, drowsiness, generalized malaise, aching, and a parched tongue and mucous membranes.
- Abdomen becomes distended (the lower the obstruction in the gastrointestinal tract, the more marked the distention).
- If uncorrected, hypovolemic shock occurs due to dehydration and loss of plasma volume.

Assessment and Diagnostic Findings

Symptoms plus imaging studies (abnormal quantities of gas and/or fluid in intestines) and laboratory studies (electrolytes and complete blood count show dehydration and possibly infection)

Medical Management

Decompression of the bowel may be achieved through a nasogastric or small bowel tube. However, when the bowel is completely obstructed, the possibility of strangulation warrants surgical intervention. Surgical treatment depends on the cause of obstruction (eg, hernia repair). Before surgery, IV therapy is instituted to replace water, sodium, chloride, and potassium.

Nursing Management

- For the nonsurgical patient, maintain the function of the nasogastric tube, assess and measure nasogastric output, assess for fluid and electrolyte imbalance, monitor nutritional status, and assess improvement (eg, return of normal bowel sounds, decreased abdominal distention, subjective improvement in abdominal pain and tenderness, passage of flatus or stool).
- Report discrepancies in intake and output, worsening of pain or abdominal distention, and increased nasogastric output.
- If patient's condition does not improve, prepare him or her for surgery.

- Provide postoperative nursing care similar to that for other abdominal surgeries (see "Preoperative and Postoperative Nursing Management" in Chapter P for additional information).

For more information, see Chapter 38 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Brain Abscess

A brain abscess is a collection of infectious material within the tissue of the brain. Bacteria are the most common causative organisms. An abscess can result from intracranial surgery, penetrating head injury, or tongue piercing. Organisms causing brain abscess may reach the brain by hematologic spread from the lungs, gums, tongue, or heart, or from a wound or intra-abdominal infection. It can be a complication in patients whose immune systems have been suppressed through therapy or disease.

Prevention

To prevent brain abscess, otitis media, mastoiditis, rhinosinusitis, dental infections, and systemic infections should be treated promptly.

Clinical Manifestations

- Generally, symptoms result from alterations in intracranial dynamics (edema, brain shift), infection, or the location of the abscess.
- Headache, usually worse in morning, is the most prevailing symptom.
- Fever, vomiting, and focal neurologic deficits (weakness and decreasing vision) occur as well.
- As the abscess expands, symptoms of increased intracranial pressure (ICP) such as decreasing level of consciousness and seizures are observed.

Assessment and Diagnostic Methods

- Neuroimaging studies such as MRI or CT scanning to identify the size and location of the abscess

- Aspiration of the abscess, guided by CT or MRI, to culture and identify the infectious organism
- Blood cultures, chest x-ray, electroencephalogram (EEG)

Medical Management

The goal is to eliminate the abscess. Treatment modalities include antimicrobial therapy, surgical incision, or aspiration (CT-guided stereotactic needle). Medications used include corticosteroids to reduce the inflammatory cerebral edema and antiseizure medications for prophylaxis against seizures (phenytoin, phenobarbital). Abscess resolution is monitored with CT scans.

Nursing Management

Nursing interventions support the medical treatment, as do patient teaching activities that address neurosurgical procedures. Patients and families need to be advised of neurologic deficits that may remain after treatment (hemiparesis, seizures, visual deficits, and cranial nerve palsies). The nurse assesses the family's ability to express their distress at the patient's condition, cope with the patient's illness and deficits, and obtain support. See "Nursing Management" under associated neurologic conditions (eg, Epilepsies, Meningitis, or Increased Intracranial Pressure).

For more information, see Chapter 64 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Brain Tumors

A brain tumor is a localized intracranial lesion that occupies space within the skull. Primary brain tumors originate from cells and structures within the brain. Secondary, or metastatic, brain tumors develop from structures outside the brain (lung, breast, lower gastrointestinal tract, pancreas, kidney, and skin [melanomas]) and occur in 10% to 20% of all cancer patients. The highest incidence of brain tumors in adults occurs between the fifth and seventh decades. Brain tumors rarely metastasize outside the central nervous system but cause

death by impairing vital functions (respiration) or by increasing the ICP. Brain tumors may be classified into several groups: those arising from the coverings of the brain (eg, dural meningioma), those developing in or on the cranial nerves (eg, acoustic neuroma), those originating within brain tissue (eg, glioma), and metastatic lesions originating elsewhere in the body. Tumors of the pituitary and pineal glands and of cerebral blood vessels are also types of brain tumors. Tumors may be benign or malignant. A benign tumor may occur in a vital area and have effects as serious as a malignant tumor.

Types of Tumors

- Gliomas, the most common brain neoplasms, cannot be totally removed without causing damage, because they spread by infiltrating into the surrounding neural tissue.
- Meningiomas are common benign encapsulated tumors of arachnoid cells on the meninges. They are slow growing and occur most often in middle-aged women.
- An acoustic neuroma is a tumor of the eighth cranial nerve (hearing and balance). It may grow slowly and attain considerable size before it is correctly diagnosed.
- Pituitary adenomas may cause symptoms as a result of pressure on adjacent structures or hormonal changes such as hyperfunction or hypofunction of the pituitary.
- Angiomas are masses composed largely of abnormal blood vessels and are found in or on the surface of the brain; they may never cause symptoms, or they may give rise to symptoms of brain tumor. The walls of the blood vessels in angiomas are thin, increasing the risk for hemorrhagic stroke.

Clinical Manifestations

Increased ICP

- Headache, although not always present, is most common in the early morning and is made worse by coughing, straining, or sudden movement. Headaches are usually described as deep, expanding, or dull but unrelenting. Frontal tumors produce a bilateral frontal headache; pituitary gland tumors produce bitemporal pain; in cerebellar tumors, the headache may be located in the suboccipital region at the back of the head.

- Vomiting, seldom related to food intake, is usually due to irritation of the vagal centers in the medulla.
- Papilledema (edema of the optic nerve) is associated with visual disturbances.
- Personality changes and a variety of focal deficits, including motor, sensory, and cranial nerve dysfunction, are common.

Localized Symptoms

The progression of the signs and symptoms is important because it indicates tumor growth and expansion. The most common focal or localized symptoms are hemiparesis, seizures, and mental status changes.

- Tumor of the motor cortex: seizurelike movements localized to one side of the body (Jacksonian seizures)
- Occipital lobe tumors: visual manifestations, such as contralateral homonymous hemianopsia (visual loss in half of the visual field on the opposite side of tumor) and visual hallucinations
- Tumors of the cerebellum: dizziness; an ataxic or staggering gait, with tendency to fall toward side of lesion; marked muscle incoordination; and nystagmus)
- Tumors of the frontal lobe: personality disorders, changes in emotional state and behavior, and an apathetic mental attitude
- Tumors of the cerebellopontine angle: usually originate in sheath of acoustic nerve; tinnitus and vertigo, then progressive nerve deafness (eighth cranial nerve dysfunction); staggering gait, numbness and tingling of the face and tongue, progressing to weakness and paralysis of the face; abnormalities in motor function may be present

Assessment and Diagnostic Methods

- History of the illness and manner in which symptoms evolved
- Neurologic examination indicating areas involved
- CT, MRI, positron emission tomography (PET), computer-assisted stereotactic (three-dimensional) biopsy, cerebral angiography, EEG, and cytologic studies of the cerebrospinal fluid

Medical Management

A variety of medical treatments, including chemotherapy and external-beam radiation therapy, are used alone or in combination with surgical resection.

Surgical Management

The objective of surgical management is to remove or destroy the entire tumor without increasing the neurologic deficit (paralysis, blindness) or to relieve symptoms by partial removal (decompression). A variety of treatment modalities may be used; the specific approach depends on the type of tumor, its location, and its accessibility. In many patients, combinations of these modalities are used.

Other Therapies

- Radiation therapy (the cornerstone of treatment for many brain tumors)
- Brachytherapy (the surgical implantation of radiation sources to deliver high doses at a short distance)
- IV autologous bone marrow transplantation for marrow toxicity associated with high doses of drugs and radiation
- Gene-transfer therapy (currently being tested)

Nursing Management

- Evaluate gag reflex and ability to swallow preoperatively.
- Teach patient to direct food and fluids toward the unaffected side. Assist patient to an upright position to eat, offer a semisoft diet, and have suction readily available if gag response is diminished.
- Reassess function postoperatively.
- Perform neurologic checks, monitor vital signs, and maintain a neurologic flow chart. Space nursing interventions to prevent rapid increase in ICP.
- Reorient patient when necessary to person, time, and place. Use orienting devices (personal possessions, photographs, lists, clock). Supervise and assist with self-care. Monitor and intervene to prevent injury.
- Monitor patients with seizures.
- Check motor function at intervals; assess sensory disturbances.

B

- Evaluate speech.
- Assess eye movement, pupil size, and reaction.

For more information, see Chapter 65 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Bronchiectasis

Bronchiectasis is a chronic, irreversible dilation of the bronchi and bronchioles and is considered a disease process separate from chronic obstructive pulmonary disease (COPD). The result is retention of secretions, obstruction, and eventual alveolar collapse. Bronchiectasis may be caused by a variety of conditions, including airway obstruction, diffuse airway injury, pulmonary infections and obstruction of the bronchus or complications of long-term pulmonary infections, genetic disorders (eg, cystic fibrosis), abnormal host defense (eg, ciliary dyskinesia or humoral immunodeficiency), and idiopathic causes. Bronchiectasis is usually localized, affecting a segment or lobe of a lung, most frequently the lower lobes. People may be predisposed to bronchiectasis as a result of recurrent respiratory infections in early childhood, measles, influenza, tuberculosis, or immunodeficiency disorders.

Clinical Manifestations

- Chronic cough and production of copious purulent sputum
- Hemoptysis, clubbing of the fingers, and repeated episodes of pulmonary infection

Assessment and Diagnostic Findings

- Definite diagnostic clue is prolonged history of productive cough, with sputum consistently negative for tubercle bacilli.
- Diagnosis is established on the basis of CT scan.

Medical Management

- Treatment objectives are to promote bronchial drainage to clear excessive secretions from the affected portion of the lungs and to prevent or control infection.
- Chest physiotherapy with percussion; postural drainage, expectorants, or bronchoscopy to remove bronchial secretions.

- Antimicrobial therapy guided by sputum sensitivity studies.
- Year-round regimen of antibiotics, alternating types of drugs at intervals.
- Vaccination against influenza and pneumococcal pneumonia.
- Bronchodilators.
- Smoking cessation.
- Surgical intervention (segmental resection of lobe or lung removal), used infrequently.
- In preparation for surgery: vigorous postural drainage, suction through bronchoscope, and antibacterial therapy.

Nursing Management

See "Nursing Management and Patient Education" under "Chronic Obstructive Pulmonary Disease" in Chapter C and "Preoperative and Postoperative Nursing Management" in Chapter P for additional information.

For more information, see Chapter 24 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Bronchitis, Chronic

Chronic bronchitis, a disease of the airways, is defined as the presence of cough and sputum production for at least 3 months in each of two consecutive years. Although, chronic bronchitis is a clinically and epidemiologically useful term, it does not reflect the major impact of airflow limitation on morbidity and mortality in COPD. In many cases, smoke or other environmental pollutants irritate the airways, resulting in inflammation and hypersecretion of mucus. Constant irritation causes the mucus-secreting glands and goblet cells to increase in number, leading to increased mucus production. Mucus plugging of the airway reduces ciliary function. Bronchial walls also become thickened, further narrowing the bronchial lumen. Alveoli adjacent to the bronchioles may become damaged and fibrosed, resulting in altered function of the alveolar macrophages. This is significant because the macrophages play an

important role in destroying foreign particles, including bacteria. As a result, the patient becomes more susceptible to respiratory infection. A wide range of viral, bacterial, and mycoplasmal infections can produce acute episodes of bronchitis. Exacerbations of chronic bronchitis are most likely to occur during the winter when viral and bacterial infections are more prevalent.

Nursing Management

See "Preoperative and Postoperative Nursing Management" in Chapter P and "Nursing Management" under "Chronic Obstructive Pulmonary Disease" in Chapter C for additional information.

For more information, see Chapter 24 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Buerger's Disease (Thromboangiitis Obliterans)

Buerger's disease is a recurring inflammation of the intermediate and small arteries and veins of the lower and upper extremities. It results in thrombus formation and segmental occlusion of the vessels and is differentiated from other vessel diseases by its microscopic appearance. Buerger's disease occurs most often in men between 20 and 35 years of age, and it has been reported in all races and in many areas of the world. There is considerable evidence that heavy smoking or chewing of tobacco is a causative or an aggravating factor.

Clinical Manifestations

- Pain is the outstanding symptom (generally bilateral and symmetric with focal lesions). Patients complain of cramps in the feet, particularly the arches, after exercise (instep claudication). Pain is relieved by rest.
- Burning pain aggravated by emotional disturbances, nicotine, or chilling; digital rest pain (fingers or toes); and a

feeling of coldness or sensitivity to cold may be early symptoms.

- Color changes (rubor) of the feet progress to cyanosis (in only one extremity or certain digits) that appears when the extremity is in a dependent position.
- Various types of paresthesia may develop; radial and ulnar artery pulses are absent or diminished if upper extremities are involved.
- Eventually ulceration and gangrene occur.

Assessment and Diagnostic Methods

Segmental limb blood pressures, duplex ultrasonography, and contrast angiography are used to identify occlusions.

Medical Management

Main objectives are to improve circulation to the extremities, prevent the progression of the disease, and protect the extremities from trauma and infection. (See "Medical Management" under "Peripheral Arterial Occlusive Disease" for additional information.) Treatment measures include the following:

- Completely stopping use of tobacco.
- Regional sympathetic block or ganglionectomy produces vasodilation and increases blood flow.
- Conservative debridement of necrotic tissue is used in treatment of ulceration and gangrene.
- If gangrene of a toe develops, usually a below-knee amputation, or occasionally an above-knee amputation, is necessary. Indications for amputation are worsening gangrene (especially if moist), severe rest pain, or severe sepsis.
- Vasodilators are rarely prescribed (cause dilation of healthy vessels only).

Nursing Management

See "Nursing Management" under "Peripheral Arterial Occlusive Disease" for additional information.

For more information, see Chapter 31 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

B

Burn Injury

Burns are caused by a transfer of energy from a heat source to the body. The depth of the injury depends on the temperature of the burning agent and the duration of contact with it. Burns disrupt the skin, which leads to increased fluid loss; infection; hypothermia; scarring; compromised immunity; and changes in function, appearance, and body image. Young children and the elderly continue to have increased morbidity and mortality when compared to other age groups with similar injuries. Inhalation injuries in addition to cutaneous burns worsen the prognosis.

Burn Depth and Breadth

Depth

The depth of a burn injury depends on the type of injury, causative agent, temperature of the burn agent, duration of contact with the agent, and the skin thickness. Burns are classified according to the depth of tissue destruction:

- Superficial partial-thickness burns (similar to first-degree), such as sunburn: The epidermis and possibly a portion of the dermis are destroyed.
- Deep partial-thickness burns (similar to second-degree), such as a scald: The epidermis and upper to deeper portions of the dermis are injured.
- Full-thickness burns (third-degree), such as a burn from a flame or electric current: The epidermis, entire dermis, and sometimes the underlying tissue, muscle, and bone are destroyed.

Extent of Body Surface Area Burned

How much total body surface area is burned is determined by one of the following methods:

- Rule of Nines: an estimation of the total body surface area burned by assigning percentages in multiples of nine to major body surfaces.
- Lund and Browder method: a more precise method of estimating the extent of the burn; takes into account that the percentage of the surface area represented by various anatomic parts (head and legs) changes with growth.

- Palm method: used to estimate percentage of scattered burns, using the size of the patient's palm (about 1% of body surface area) to assess the extent of burn injury.

Gerontologic Considerations

Elderly people are at higher risk for burn injury because of reduced coordination, strength, and sensation and changes in vision. Predisposing factors and the health history in the older adult influence the complexity of care for the patient. Pulmonary function is limited in the older adult and therefore airway exchange, lung elasticity, and ventilation can be affected. This can be further affected by a history of smoking. Decreased cardiac function and coronary artery disease increase the risk of complications in elderly patients with burn injuries. Malnutrition and presence of diabetes mellitus or other endocrine disorders present nutritional challenges and require close monitoring. Varying degrees of orientation may present themselves on admission or through the course of care making assessment of pain and anxiety a challenge for the burn team. The skin of the elderly is thinner and less elastic, which affects the depth of injury and its ability to heal.

NURSING ALERT

Education on the prevention of burn injury is especially important among the elderly. Assess an elderly patient's ability to safely perform ADLs, assist elderly patients and families to modify their environment to ensure safety, and make referrals as needed.

Medical Management

Four major goals relating to burn management are prevention, institution of life-saving measures for the severely burned person, prevention of disability and disfigurement, and rehabilitation.

Nursing Management: Emergent/ Resuscitative Phase

Assessment

- Focus on the major priorities of any trauma patient; the burn wound is a secondary consideration, although aseptic

management of the burn wounds and invasive lines continues.

- Assess circumstances surrounding the injury: time of injury, mechanism of burn, whether the burn occurred in a closed space, the possibility of inhalation of noxious chemicals, and any related trauma.
- Monitor vital signs frequently; monitor respiratory status closely; and evaluate apical, carotid, and femoral pulses particularly in areas of circumferential burn injury to an extremity.
- Start cardiac monitoring if indicated (eg, history of cardiac or respiratory problems, electrical injury).
- Check peripheral pulses on burned extremities hourly; use Doppler as needed.
- Monitor fluid intake (IV fluids) and output (urinary catheter) and measure hourly. Note amount of urine obtained when catheter is inserted (indicates preburn renal function and fluid status).
- Assess body temperature, body weight, history of preburn weight, allergies, tetanus immunization, past medical-surgical problems, current illnesses, and use of medications.
- Arrange for patients with facial burns to be assessed for corneal injury.
- Continue to assess the extent of the burn; assess depth of wound, and identify areas of full- and partial-thickness injury.
- Assess neurologic status: consciousness, psychological status, pain and anxiety levels, and behavior.
- Assess patient's and family's understanding of injury and treatment. Assess patient's support system and coping skills.

Interventions

Promoting Gas Exchange and Airway Clearance

- Provide humidified oxygen, and monitor arterial blood gases (ABGs), pulse oximetry, and carboxyhemoglobin levels.
- Assess breath sounds and respiratory rate, rhythm, depth, and symmetry; monitor for hypoxia.
- Observe for signs of inhalation injury: blistering of lips or buccal mucosa; singed nostrils; burns of face, neck, or chest; increasing hoarseness; or soot in sputum or respiratory secretions.

- Report labored respirations, decreased depth of respirations, or signs of hypoxia to physician immediately; prepare to assist with intubation and escharotomies.
- Monitor mechanically ventilated patient closely.
- Institute aggressive pulmonary care measures: turning, coughing, deep breathing, periodic forceful inspiration using spirometry, and tracheal suctioning.
- Maintain proper positioning to promote removal of secretions and patent airway and to promote optimal chest expansion; use artificial airway as needed.

Restoring Fluid and Electrolyte Balance

- Monitor vital signs and urinary output (hourly), central venous pressure (CVP), pulmonary artery pressure, and cardiac output. Note and report signs of hypovolemia or fluid overload.
- Maintain IV lines and regular fluids at appropriate rates, as prescribed. Document intake, output, and daily weight.
- Elevate the head of bed and burned extremities.
- Monitor serum electrolyte levels (eg, sodium, potassium, calcium, phosphorus, bicarbonate); recognize developing electrolyte imbalances.
- Notify physician immediately of decreased urine output; blood pressure; central venous, pulmonary artery, or pulmonary artery wedge pressures; or increased pulse rate.

Maintaining Normal Body Temperature

- Provide warm environment: use heat shield, space blanket, heat lights, or blankets.
- Assess core body temperature frequently.
- Work quickly when wounds must be exposed to minimize heat loss from the wound.

Minimizing Pain and Anxiety

- Use a pain scale to assess pain level (ie, 1 to 10); differentiate between restlessness due to pain and restlessness due to hypoxia.
- Administer IV opioid analgesics as prescribed, and assess response to medication; observe for respiratory depression in patient who is not mechanically ventilated.
- Provide emotional support, reassurance, and simple explanations about procedures.

- Assess patient and family understanding of burn injury, coping strategies, family dynamics, and anxiety levels. Provide individualized responses to support patient and family coping; explain all procedures in clear, simple terms.
- Provide pain relief, and give antianxiety medications if patient remains highly anxious and agitated after psychological interventions.

Monitoring and Managing Potential Complications

- Acute respiratory failure: Assess for increasing dyspnea, stridor, changes in respiratory patterns; monitor pulse oximetry and ABG values to detect problematic oxygen saturation and increasing CO_2; monitor chest x-rays; assess for cerebral hypoxia (eg, restlessness, confusion); report deteriorating respiratory status immediately to physician; and assist as needed with intubation or escharotomy.
- Distributive shock: Monitor for early signs of shock (decreased urine output, cardiac output, pulmonary artery pressure, pulmonary capillary wedge pressure, blood pressure, or increasing pulse) or progressive edema. Administer fluid resuscitation as ordered in response to physical findings; continue monitoring fluid status.
- Acute renal failure: Monitor and report abnormal urine output and quality, blood urea nitrogen (BUN) and creatinine levels; assess for urine hemoglobin or myoglobin; administer increased fluids as prescribed.
- Compartment syndrome: Assess peripheral pulses hourly with Doppler; assess neurovascular status of extremities hourly (warmth, capillary refill, sensation, and movement); remove blood pressure cuff after each reading; elevate burned extremities; report any extremity pain, loss of peripheral pulses or sensation; prepare to assist with escharotomies.
- Paralytic ileus: Maintain nasogastric tube on low intermittent suction until bowel sounds resume; auscultate abdomen regularly for distention and bowel sounds.
- Curling's ulcer: Assess gastric aspirate for blood and pH; assess stools for occult blood; administer antacids and histamine blockers (eg, ranitidine [Zantac]) as prescribed.

Nursing Management: Acute/ Intermediate Phase

The acute or intermediate phase begins 48 to 72 hours after the burn injury. Burn wound care and pain control are priorities at this stage.

Assessment

- Focus on hemodynamic alterations, wound healing, pain and psychosocial responses, and early detection of complications.
- Measure vital signs frequently; respiratory and fluid status remains highest priority.
- Assess peripheral pulses frequently for first few days after the burn for restricted blood flow.
- Closely observe hourly fluid intake and urinary output, as well as blood pressure and cardiac rhythm; changes should be reported to the burn surgeon promptly.
- For patient with inhalation injury, regularly monitor level of consciousness, pulmonary function, and ability to ventilate; if patient is intubated and placed on a ventilator, frequent suctioning and assessment of the airway are priorities.

Interventions

Restoring Normal Fluid Balance

- Monitor IV and oral fluid intake; use IV infusion pumps.
- Measure intake and output and daily weight.
- Report changes (eg, blood pressure, pulse rate) to physician.

Preventing Infection

- Provide a clean and safe environment; protect patient from sources of crosscontamination (eg, visitors, other patients, staff, equipment).
- Closely scrutinize wound to detect early signs of infection. Monitor culture results and white blood cell counts.
- Practice clean technique for wound care procedures and aseptic technique for any invasive procedures. Use meticulous hand hygiene before and after contact with patient.
- Caution patient to avoid touching wounds or dressings; wash unburned areas and change linens regularly.

Maintaining Adequate Nutrition

- Initiate oral fluids slowly when bowel sounds resume; record tolerance—if vomiting and distention do not occur, fluids

may be increased gradually and the patient may be advanced to a normal diet or to tube feedings.

- Collaborate with dietitian to plan a protein- and calorie-rich diet acceptable to patient. Encourage family to bring nutritious and patient's favorite foods. Provide nutritional and vitamin and mineral supplements if prescribed.
- Document caloric intake. Insert feeding tube if caloric goals cannot be met by oral feeding (for continuous or bolus feedings); note residual volumes.
- Weigh patient daily and graph weights.

Promoting Skin Integrity

- Assess wound status.
- Support patient during distressing and painful wound care.
- Coordinate complex aspects of wound care and dressing changes.
- Assess burn for size, color, odor, eschar, exudate, epithelial buds (small pearl-like clusters of cells on the wound surface), bleeding, granulation tissue, the status of graft take, healing of the donor site, and the condition of the surrounding skin; report any significant changes to the physician.
- Inform all members of the health care team of latest wound care procedures in use for the patient.
- Assist, instruct, support, and encourage patient and family to take part in dressing changes and wound care.
- Early on, assess strengths of patient and family in preparing for discharge and home care.

Relieving Pain and Discomfort

- Frequently assess pain and discomfort; administer analgesic agents and anxiolytic medications, as prescribed, before the pain becomes severe. Assess and document the patient's response to medication and any other interventions.
- Teach patient relaxation techniques. Give some control over wound care and analgesia. Provide frequent reassurance.
- Use guided imagery and distraction to alter patient's perceptions and responses to pain; hypnosis, music therapy, and virtual reality are also useful.
- Assess the patient's sleep patterns daily; administer sedatives, if prescribed.

- Work quickly to complete treatments and dressing changes. Encourage patient to use analgesic medications before painful procedures.
- Promote comfort during healing phase with the following: oral antipruritic agents, a cool environment, frequent lubrication of the skin with water or a silica-based lotion, exercise and splinting to prevent skin contracture, and diversional activities.

Promoting Physical Mobility

- Prevent complications of immobility (atelectasis, pneumonia, edema, pressure ulcers, and contractures) by deep breathing, turning, and proper repositioning.
- Modify interventions to meet patient's needs. Encourage early sitting and ambulation. When legs are involved, apply elastic pressure bandages before assisting patient to upright position.
- Make aggressive efforts to prevent contractures and hypertrophic scarring of the wound area after wound closure for a year or more.
- Initiate passive and active range-of-motion exercises from admission until after grafting, within prescribed limitations.
- Apply splints or functional devices to extremities for contracture control; monitor for signs of vascular insufficiency, nerve compression, and skin breakdown.

Strengthening Coping Strategies

- Assist patient to develop effective coping strategies: Set specific expectations for behavior, promote truthful communication to build trust, help patient practice coping strategies, and give positive reinforcement when appropriate.
- Demonstrate acceptance of patient. Enlist a noninvolved person for patient to vent feelings without fear of retaliation.
- Include patient in decisions regarding care. Encourage patient to assert individuality and preferences. Set realistic expectations for self-care.

Supporting Patient and Family Processes

- Support and address the verbal and nonverbal concerns of the patient and family.

- Instruct family in ways to support patient.
- Make psychological or social work referrals as needed.
- Provide information about burn care and expected course of treatment.
- Initiate patient and family education during burn management. Assess and consider preferred learning styles; assess ability to grasp and cope with the information; determine barriers to learning when planning and executing teaching.
- Remain sensitive to the possibility of changing family dynamics.

Monitoring and Managing Potential Complications

- Heart failure: Assess for fluid overload, decreased cardiac output, oliguria, jugular vein distention, edema, or onset of S_3 or S_4 heart sounds.
- Pulmonary edema: Assess for increasing CVP, pulmonary artery and wedge pressures, and crackles; report promptly. Position comfortably with head elevated unless contraindicated. Administer medications and oxygen as prescribed and assess response.
- Sepsis: Assess for increased temperature, increased pulse, widened pulse pressure, and flushed, dry skin in unburned areas (early signs), and note trends in the data. Perform wound and blood cultures as prescribed. Give scheduled antibiotics on time.
- Acute respiratory failure and acute respiratory distress syndrome (ARDS): Monitor respiratory status for dyspnea, change in respiratory pattern, and onset of adventitious sounds. Assess for decrease in tidal volume and lung compliance in patients on mechanical ventilation. The hallmark of onset of ARDS is hypoxemia on 100% oxygen, decreased lung compliance, and significant shunting; notify physician of deteriorating respiratory status.
- Visceral damage (from electrical burns): Monitor electrocardiogram (ECG) and report dysrhythmias; pay attention to pain related to deep muscle ischemia and report. Early detection may minimize severity of this complication. Fasciotomies may be necessary to relieve swelling and ischemia in the muscles and fascia; monitor patient for excessive blood loss and hypovolemia after fasciotomy.

NURSING PROCESS

Rehabilitation Phase

Rehabilitation should begin immediately after the burn has occurred. Wound healing, psychosocial support, and restoring maximum functional activity remain priorities. Maintaining fluid and electrolyte balance and improving nutrition status continue to be important.

Assessment

- In early assessment, obtain information about patient's educational level, occupation, leisure activities, cultural background, religion, and family interactions.
- Assess self-concept, mental status, emotional response to the injury and hospitalization, level of intellectual functioning, previous hospitalizations, response to pain and pain relief measures, and sleep pattern.
- Perform ongoing assessments relative to rehabilitation goals, including range of motion of affected joints, functional abilities in ADLs, early signs of skin breakdown from splints or positioning devices, evidence of neuropathies (neurologic damage), activity tolerance, and quality or condition of healing skin.
- Document participation and self-care abilities in ambulation, eating, wound cleaning, and applying pressure wraps.
- Maintain comprehensive and continuous assessment for early detection of complications, with specific assessments as needed for specific treatments, such as postoperative assessment of patient undergoing primary excision.

Diagnosis

Nursing Diagnoses

- Activity intolerance related to pain on exercise, limited joint mobility, muscle wasting, and limited endurance
- Disturbed body image related to altered appearance and self-concept
- Deficient knowledge of postdischarge home care and recovery needs

B

Collaborative Problems/Potential Complications

- Contractures
- Inadequate psychological adaptation to burn injury

Planning and Goals

Goals include increased participation in ADLs; increased understanding of the injury, treatment, and planned follow-up care; adaptation and adjustment to alterations in body image, self-concept, and lifestyle; and absence of complications.

Nursing Interventions

Promoting Activity Tolerance

- Schedule care to allow periods of uninterrupted sleep. Administer hypnotic agents, as prescribed, to promote sleep.
- Communicate plan of care to family and other caregivers.
- Reduce metabolic stress by relieving pain, preventing chilling or fever, and promoting integrity of all body systems to help conserve energy. Monitor fatigue, pain, and fever to determine amount of activity to be encouraged daily.
- Incorporate physical therapy exercises to prevent muscular atrophy and maintain mobility required for daily activities.
- Support positive outlook, and increase tolerance for activity by scheduling diversion activities in periods of increasing duration.

Improving Body Image and Self-Concept

- Take time to listen to patient's concerns and provide realistic support; refer patient to a support group to develop coping strategies to deal with losses.
- Assess patient's psychosocial reactions; provide support and develop a plan to help the patient handle feelings. Promote a healthy body image and self-concept by helping patient practice responses to people who stare or ask about the injury.
- Support patient through small gestures such as providing a birthday cake, combing patient's hair before visitors, and sharing information on cosmetic resources to enhance appearance.

- Teach patient ways to direct attention away from a disfigured body to the self within.
- Coordinate communications of consultants, such as psychologists, social workers, vocational counselors, and teachers, during rehabilitation.

Monitoring and Managing Potential Complications

- Contractures: Provide early and aggressive physical and occupational therapy; support patient if surgery is needed to achieve full range of motion.
- Impaired psychological adaptation to the burn injury: Obtain psychological or psychiatric referral as soon as evidence of major coping problems appears.

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE

- Throughout the phases of burn care, make efforts to prepare patient and family for the care they will perform at home. Instruct them about measures and procedures.
- Provide verbal and written instructions about wound care, prevention of complications, pain management, and nutrition.
- Inform and review with patient specific exercises and use of elastic pressure garments and splints; provide written instructions.
- Teach patient and family to recognize abnormal signs and report them to the physician.
- Assist the patient and family in planning for the patient's continued care by identifying and acquiring supplies and equipment that are needed at home.
- Encourage and support follow-up wound care.
- Refer patient with inadequate support system to home care resources for assistance with wound care and exercises.
- Evaluate patient status periodically for modification of home care instructions and/or planning for reconstructive surgery.

Evaluation

Expected Patient Outcomes

- Demonstrates activity tolerance required for desired daily activities

- Adapts to altered body image
- Demonstrates knowledge of required self-care and follow-up care
- Exhibits no complications

For more information, see Chapter 57 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L, & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.



C

Cancer

Cancer is a disease process that begins when an abnormal cell is transformed by the genetic mutation of the cellular DNA.

Pathophysiology

The abnormal cell forms a clone and begins to proliferate abnormally, ignoring growth-regulating signals in the environment surrounding the cell. The cells acquire invasive characteristics, and changes occur in surrounding tissues. The cells infiltrate these tissues and gain access to lymph and blood vessels, which carry the cells to other areas of the body. This phenomenon is called metastasis (cancer spread to other parts of the body).

Cancerous cells are described as malignant neoplasms and are classified and named by tissue of origin. The failure of the immune system to promptly destroy abnormal cells permits these cells to grow too large to be managed by normal immune mechanisms. Certain categories of agents or factors implicated in carcinogenesis (malignant transformation) include viruses and bacteria, physical agents, chemical agents, genetic or familial factors, dietary factors, and hormonal agents.

Cancer is the second leading cause of death in the United States, with most cancers occurring in men and in people older than 65 years. Cancer also has a higher incidence in industrialized sectors and nations.

Clinical Manifestations

- Cancerous cells spread from one organ or body part to another by invasion and metastasis; therefore, manifestations are related to the system affected and degree of disruption (see the specific type of cancer).
- Generally, cancer causes anemia, weakness, weight loss (dysphagia, anorexia, blockage), and pain (often in late stages).

- Symptoms are from tissue destruction and replacement with nonfunctional cancer tissue or overproductive cancer tissue (eg, bone marrow disruption and anemia or excess adrenal steroid production); pressure on surrounding structures; increased metabolic demands; and disruption of production of blood cells.

Assessment and Diagnostic Methods

Screening to detect early cancer usually focuses on cancers with the highest incidence or those that have improved survival rates if diagnosed early. Examples of these cancers include breast, colorectal, cervical, endometrial, testicular, skin, and oropharyngeal cancers. Patients with suspected cancer undergo extensive testing to

- Determine the presence and extent of tumor.
- Identify possible spread (metastasis) of disease or invasion of other body tissues.
- Evaluate the function of involved and uninvolved body systems and organs.
- Obtain tissue and cells for analysis, including evaluation of tumor stage and grade.

Diagnostic tests may include tumor marker identification, genetic profiling, imaging studies (mammography, magnetic resonance imaging [MRI], computed tomography [CT], fluoroscopy, ultrasonography, endoscopy, nuclear medicine imaging, positron emission tomography [PET], PET fusion, radioimmunoconjugates), and biopsy.

Tumor Staging and Grading

Staging

Staging determines the size of the tumor and the existence of local invasion and distant metastasis. Several systems exist for classifying the anatomic extent of disease. The TNM system is frequently used (T refers to the extent of the primary tumor, N refers to lymph node involvement, and M refers to the extent of metastasis; see Box C-1 for a summary of tumor stages). A variety of other staging systems are used to describe the extent of cancers, such as central nervous system (CNS) cancers, hematologic cancers,

BOX C-1 *Stages of Tumors*

Stage I: tumor less than 2 cm, negative lymph node involvement, no detectable metastases

Stage II: tumor greater than 2 cm but less than 5 cm, negative or positive unfixed lymph node involvement, no detectable metastases

Stage III: large tumor greater than 5 cm, or a tumor of any size with invasion of the skin or chest wall or positive fixed lymph node involvement in the clavicular area without evidence of metastases

Stage IV: tumor of any size, positive or negative lymph node involvement, and distant metastases

and malignant melanoma, that are not well described by the TNM system.

Grading

Grading refers to the classification of the tumor cells. Grading systems seek to define the type of tissue from which the tumor originated and the degree to which the tumor cells retain the functional and histologic characteristics of the tissue of origin (differentiation). Samples of cells to be used to establish the grade of a tumor may be obtained from tissue scrapings, body fluids, secretions, or washings, biopsy, or surgical excision. This information helps the health care team predict the behavior and prognosis of various tumors. The tumor is assigned a numeric value ranging from 1 (well-differentiated) to 4 (poorly differentiated or undifferentiated).

Medical Management

The range of possible treatment goals may include complete eradication of malignant disease (cure), prolonged survival and containment of cancer cell growth (control), or relief of symptoms associated with the disease (palliation). A variety of therapies may be used, including the following:

- Surgery (eg, excisions, video-assisted endoscopic surgery, salvage surgery, electrosurgery, cryosurgery, chemosurgery, or laser surgery). Surgery may be the primary method of treatment or

it may be prophylactic, palliative, or reconstructive. The goal of surgery is to remove the tumor or as much as is feasible.
- Radiation therapy and chemotherapy (may be used individually or in combination).
- Bone marrow transplantation (BMT).
- Hyperthermia.
- Other targeted therapies (eg, biologic response modifiers [BRMs], gene therapy, complementary and alternative medicine [CAM]).

Nursing Management

Maintaining Tissue Integrity

Some of the most frequently encountered disturbances of tissue integrity include stomatitis, skin and tissue reactions to radiation therapy, alopecia, and malignant skin lesions.

Managing Stomatitis

- Assess oral cavity daily.
- Instruct patient to report oral burning, pain, areas of redness, open lesions on the lips, pain associated with swallowing, or decreased tolerance to temperature extremes of food.
- Encourage and assist in oral hygiene (brush with soft toothbrush, use nonabrasive toothpaste after meals and bedtime, floss every 24 hours unless painful or platelet count falls below 40,000/mm^3); advise patient to avoid irritants such as commercial mouthwashes, alcoholic beverages, and tobacco.
- For mild stomatitis, use normal saline mouth rinses and a soft toothbrush or toothette, remove dentures except for meals (make sure dentures fit properly), apply water-soluble lip lubricant, and avoid foods that are spicy or hard to chew and those with extremes of temperature.
- For severe stomatitis, obtain tissue samples for culture and sensitivity tests, assess gag reflex and ability to chew and swallow, use oral rinses as prescribed or position patient on side and irrigate mouth with suction available, remove dentures, use toothette or gauze soaked with solution for cleansing, use water-soluble lip lubricant, provide liquid or pureed diet, and monitor for dehydration.

- Help patient minimize discomfort by using prescribed topical anesthetic, administering prescribed systemic analgesics, and performing appropriate mouth care.

Managing Radiation-Associated Skin Impairments

- Provide careful skin care by avoiding the use of soaps, cosmetics, perfumes, powders, lotions and ointments, and deodorants. Use only lukewarm water to bathe the area, and avoid applying hot-water bottles, heating pads, ice, and adhesive tape to the area. Do not shave the area.
- Instruct the patient to avoid rubbing or scratching the area, exposing the area to sunlight or cold weather, or wearing tight clothing over the area.
- If wet desquamation occurs, do not disrupt any blisters that have formed, report blistering, and use prescribed ointments. If the area weeps, apply a nonadhesive absorbent dressing. If the area is without drainage, use moisture and vapor-permeable dressings such as hydrocolloids and hydrogels on noninfected areas.

Addressing Alopecia

- Discuss potential hair loss and regrowth with patient and family; advise that hair loss may occur on body parts other than the head.
- Explore potential impact of hair loss on self-image, interpersonal relationships, and sexuality.
- Prevent or minimize hair loss (use scalp hypothermia and scalp tourniquets, if appropriate, cut long hair before treatment, avoid excessive shampooing and any hair processing, avoid excessive combing or brushing).
- Suggest ways to assist in coping with hair loss (eg, purchase wig or hairpiece before hair loss; wear head coverings).
- Explain that hair growth usually begins again once therapy is completed.

Managing Malignant Skin Lesions

- Carefully assess and cleanse the skin, reducing superficial bacteria, controlling bleeding, reducing odor, protecting skin from pain and further trauma, and relieving pain.
- Assist and guide the patient and family regarding care for these skin lesions at home; refer for home care as indicated.

Promoting Nutrition

Most patients with cancer experience some weight loss during their illness. Anorexia, malabsorption, and cachexia are common examples of nutritional problems.

- Teach the patient to avoid unpleasant sights, odors, and sounds in the environment during mealtime.
- Suggest foods that are preferred and well tolerated by the patient, preferably high-calorie and high-protein foods. Respect ethnic and cultural food preferences.
- Encourage adequate fluid intake, but limit fluids at mealtime.
- Suggest smaller, more frequent meals.
- Promote relaxed, quiet environment during mealtime with increased social interaction as desired.
- Encourage nutritional supplements and high-protein foods between meals.
- Encourage frequent oral hygiene and provide pain relief measures to make meals more pleasant.
- Provide control of nausea and vomiting.
- Decrease anxiety by encouraging verbalization of fears and concerns, use of relaxation techniques, and imagery at mealtime.
- For collaborative management, provide enteral tube feedings of commercial liquid diets, elemental diets, or blenderized foods as prescribed.
- Administer appetite stimulants as prescribed by physician.
- Encourage family and friends not to nag or cajole patient about eating.
- Assess and address other contributing factors to nausea, vomiting, and anorexia, such as other symptoms, constipation, gastrointestinal (GI) irritation, electrolyte imbalance, radiation therapy, medications, and CNS metastasis.

Relieving Pain

- Use a multidisciplinary team approach to determine optimal management of pain for optimal quality of life.
- Assure patient that you know that pain is real and will assist him or her in reducing it.
- Help patient and family play an active role in managing pain.
- Provide education and support to correct fears and misconceptions about opioid use.

- Encourage strategies of pain relief that patient has used successfully in previous pain experience.
- Teach patient new strategies to relieve pain and discomfort: distraction, imagery, relaxation, cutaneous stimulation, etc.

Decreasing Fatigue

- Help patient and family to understand that fatigue is usually an expected and temporary side effect of the cancer process and treatments.
- Help patient to rearrange daily schedule and organize activities to conserve energy expenditure; encourage patient to alternate periods of rest and activity.
- Encourage patient and family to plan to reallocate responsibilities, such as childcare, cleaning, and preparing meals. A patient who is employed full time may need to reduce the number of hours worked each week.
- Encourage adequate protein and calorie intake; assess for fluid and electrolyte disturbances.
- Encourage regular, light exercise, which may decrease fatigue and facilitate coping.
- Encourage use of relaxation techniques and mental imagery.
- Address factors that contribute to fatigue and implement pharmacologic and nonpharmacologic strategies to manage pain.
- Administer blood products as prescribed.

Improving Body Image and Self-Esteem

A creative and positive approach is essential when caring for the patient with altered body image. It is also important to individualize care for each patient.

- Assess patient's feelings about body image and level of self-esteem. Encourage patient to verbalize concerns.
- Identify potential threats to patient's self-esteem (eg, altered appearance, decreased sexual function, hair loss, decreased energy, role changes). Validate concerns with patient.
- Encourage continued participation in activities and decision making.
- Assist patient in self-care when fatigue, lethargy, nausea, vomiting, and other symptoms prevent independence.
- Assist patient in selecting and using cosmetics, scarves, hair pieces, and clothing that increase his or her sense of attractiveness.

- Encourage patient and partner to share concerns about altered sexuality and sexual function and to explore alternatives to their usual sexual expression.
- Refer patient to collaborating specialists as needed.

Assisting in Grieving

- Encourage verbalization of fears, concerns, negative feelings, and questions regarding disease, treatment, and future implications. Explore previous successful coping strategies.
- Encourage active participation of patient or family in care and treatment decisions.
- Visit family frequently to establish and maintain relationships and physical closeness.
- Involve spiritual advisor as desired by the patient and family.
- Allow for progression through the grieving process at the individual pace of the patient and family.
- Advise professional counseling as indicated for patient or family to alleviate pathologic grieving.
- If patient enters the terminal phase of disease, assist patient and family to acknowledge and cope with their reactions and feelings.
- Maintain contact with the surviving family members after death of the patient. This may help them to work through their feelings of loss and grief.

Monitoring and Managing Potential Complications

Managing Infection

- Assess patient for evidence of infection: Check vital signs every 4 hours, monitor white blood cell (WBC) count and differential each day, and inspect all sites that may serve as entry ports for pathogens (eg, intravenous [IV] sites, wounds, skin folds, bony prominences, perineum, and oral cavity).
- Report fever (≥38.3°C [101°F] or ≥38°C [100.4°F] for greater than 1 hour), chills, diaphoresis, swelling, heat, pain, erythema, exudate on any body surfaces. Also report change in respiratory or mental status, urinary frequency or burning, malaise, myalgias, arthralgias, rash, or diarrhea.
- Discuss with patient and family about placing patient in private room if absolute WBC count is less than 1,000/mm^3 and the importance of patient avoiding contact with people who have known or recent infection or recent vaccination.

- Instruct all personnel in careful hand hygiene before and after entering room.
- Avoid rectal or vaginal procedures (rectal temperatures, examinations, suppositories, vaginal tampons) and intramuscular injections. Avoid insertion of urinary catheters; if catheters are necessary, use strict aseptic technique.

Managing Septic Shock

- Assess frequently for infection and inflammation throughout the course of the disease.
- Prevent septicemia and septic shock, or detect and report for prompt treatment.
- Monitor for signs and symptoms of septic shock (altered mental status, either subnormal or elevated temperature, cool and clammy skin, decreased urine output, hypotension, tachycardia, other dysrhythmias, electrolyte imbalances, tachypnea, and abnormal arterial blood gas [ABG] values).
- Instruct patient and family about signs of septicemia, methods for preventing infection, and actions to take if infection or septicemia occurs.

Managing Bleeding and Hemorrhage

- Monitor platelet count and assess for bleeding (eg, petechiae or ecchymosis; decrease in hemoglobin or hematocrit; prolonged bleeding from invasive procedures, venipunctures, minor cuts, or scratches; frank or occult blood in any body excretion, emesis, or sputum; bleeding from any body orifice; altered mental status).
- Instruct patient and family about ways to minimize bleeding (eg, use soft toothbrush or toothette for mouth care, use electric razor for shaving, avoid foods that are difficult to chew).
- Initiate measures to minimize bleeding, (eg, draw blood for all laboratory work with one daily venipuncture; avoid taking temperature rectally or administering suppositories and enemas; avoid intramuscular injections, use smallest needle possible if necessary; avoid bladder catheterizations, use smallest catheter if necessary; maintain fluid intake of at least 3 L/24 h unless contraindicated; avoid medications that will interfere with clotting such as, aspirin; recommend use of water-based lubricant before sexual intercourse).

- When platelet count is less than 20,000/mm^3, institute bed rest with padded side rails, avoidance of strenuous activity, and platelet transfusions as prescribed.

Promoting Home- and Community-Based Care

Teaching Patients Self-Care

- Provide information needed by patient and family to address the most immediate care needs likely to be encountered at home.
- Verbally review, and reinforce with written information, the side effects of treatments and changes in the patient's status that should be reported.
- Discuss strategies to deal with side effects of treatment with patient and family.
- Identify learning needs on the basis of the priorities identified by patient and family as well as on the complexity of home care.
- Instruct patient and family and provide ongoing support that allows them to feel comfortable and proficient in managing treatments at home.
- Refer for home care nursing to provide care and support for patients receiving advanced technical care.
- Provide follow-up visits and phone calls to patient and family, and evaluate patient progress and ongoing needs.

Continuing Care

- Refer patient for home care (assessment of the home environment, suggestions for modifications to assist patient and family in addressing patient's physical needs and physical care, and ongoing assessment of the psychological and emotional effects of the illness on patient and the family).
- Assess changes in the patient's physical status and report relevant changes to the physician.
- Assess adequacy of pain management and the effectiveness of other strategies to prevent or manage side effects of treatment.
- Help coordinate patient care by maintaining close communication with all health care providers involved in the patient's care.
- Make referrals and coordinate available community resources (eg, local office of the American Cancer Society,

home aides, church groups, and support groups) to assist patients and caregivers.

Nursing Management Related to Treatment

Cancer Surgery

- Complete a thorough preoperative assessment for all factors that may affect patients undergoing surgery.
- Assist patient and family in dealing with the possible changes and outcomes resulting from surgery; provide education and emotional support by assessing patient and family needs and exploring with them their fears and coping mechanisms. Encourage them to take an active role in decision making when possible.
- Explain and clarify information the physician has provided about the results of diagnostic testing and surgical procedures, if asked.
- Communicate frequently with the physician and other health care team members to ensure that the information provided is consistent.
- After surgery, assess patient's responses to the surgery and monitor for complications such as infection, bleeding, thrombophlebitis, wound dehiscence, fluid and electrolyte imbalance, and organ dysfunction.
- Provide for patient comfort.
- Provide postoperative teaching that addresses wound care, activity, nutrition, and medications.
- Initiate plans for discharge, follow-up care, and treatment as early as possible to ensure continuity of care.
- Encourage patient and family to use community resources such as the American Cancer Society for support and information.

Radiation Therapy

- Answer questions and allay fears of patient and family about the effects of radiation on others, on the tumor, and on normal tissues and organs.
- Explain the procedure for delivering radiation. Describe the equipment; the duration of the procedure (often minutes); the possible need for immobilizing the patient during the procedure; and the absence of new sensations, including pain, during the procedure.

- Assess patient's skin and oropharyngeal mucosa, nutritional status, and general feeling of well-being.
- Reassure the patient that systemic symptoms (eg, weakness, fatigue) are a result of the treatment and do not represent deterioration or progression of the disease.
- If a radioactive implant is used, inform patient about the restrictions placed on visitors and health care personnel and other radiation precautions as well as the patient's own role before, during, and after the procedure.
- Maintain bed rest for patient with an intracavitary delivery device. Use the log-roll maneuver when positioning patient to prevent displacing the intracavitary device. Provide a low-residue diet and antidiarrheal agents to prevent bowel movements during therapy to prevent the radioisotopes from being displaced. Maintain an indwelling urinary catheter to ensure that the bladder empties.
- Assist the weak or fatigued patient with activities of daily living and personal hygiene, including gentle oral hygiene to remove debris, prevent irritation, and promote healing.
- Follow the instructions provided by the radiation safety officer from the radiology department, which identify the maximum time a health care provider can spend safely in the patient's room, the shielding equipment to be used, and special precautions and actions to be taken if the implant is dislodged. Explain the rationale for these precautions to patient.

NURSING ALERT

For safety in brachytherapy, assign the patient to a private room, and post appropriate notices about radiation safety precautions. Have staff members wear dosimeter badges. Make sure that pregnant staff members are not assigned to this patient's care. Prohibit visits by children or pregnant women and limit visits from others to 30 minutes daily. Instruct and monitor visitors to ensure they maintain a 6-ft distance from the radiation source.

Chemotherapy

- Assess patient's nutritional and fluid and electrolyte status frequently. Use creative ways to encourage adequate fluid and dietary intake.

- Because of increased risk of anemia, infection, and bleeding disorders, focus nursing assessment and care on identifying and modifying factors that further increase the risk.
- Use aseptic technique and gentle handling to prevent infection and trauma.
- Closely monitor laboratory test results (blood cell counts), and promptly report untoward changes and signs of infection or bleeding.
- Carefully select peripheral veins and perform venipuncture, and carefully administer drugs. Monitor for indications of extravasation during drug administration (eg, absence of blood return from the IV catheter; resistance to flow of IV fluid; or swelling, pain, or redness at the site).

NURSING ALERT

If extravasation is suspected, stop the drug administration immediately and apply ice to the site (unless the extravasated vesicant is a vinca alkaloid).

- Assist patient with delayed nausea and vomiting (occurring later than 48 to 72 hours after chemotherapy) by teaching the patient to take antiemetic medications as necessary for the first week at home after chemotherapy and by teaching relaxation techniques and imagery, which can help to decrease stimuli contributing to symptoms.
- Advise patient to eat small frequent meals, bland foods, and comfort foods, which may reduce the frequency or severity of these symptoms.
- Monitor blood cell counts frequently, note and report neutropenia, and protect the patient from infection and injury, particularly when blood cell counts are depressed.
- Monitor blood urea nitrogen (BUN), serum creatinine, creatinine clearance, and serum electrolyte levels, and report any findings that indicate decreasing renal function.
- Provide adequate hydration, dieresis, and alkalinization of the urine to prevent formation of uric acid crystals; administer allopurinol to prevent these side effects.
- Monitor closely for signs of heart failure, cardiac ejection fraction (volume of blood ejected from the heart with each

beat), and pulmonary fibrosis (eg, pulmonary function test results).

- Inform patient and partner about potential changes in reproductive ability resulting from chemotherapy and options. (Banking of sperm is recommended for men before treatments.) Advise patient and partner to use reliable birth control measures while receiving chemotherapy because sterility is not certain.
- Inform patient that the taxanes and plant alkaloids, especially vincristine, can cause peripheral neurologic damage with sensory alterations in the feet and hands; these side effects are usually reversible after completion of chemotherapy, but they may take months to resolve.
- Help patient and family to plan strategies to combat fatigue.
- Use precautions developed by the Occupational Safety and Health Administration (OSHA), Oncology Nursing Society (ONS), hospitals, and other health care agencies to protect health care personnel who handle chemotherapeutic agents.

Bone Marrow Transplantation

- Before BMT, perform nutritional assessments and extensive physical examinations and ensure that organ function tests, as well as psychological evaluations, are completed as ordered.
- Ensure that patient's social support systems and financial and insurance resources are evaluated.
- Reinforce information for informed consent.
- Provide patient teaching about the procedure and pretransplantation and posttransplantation care.
- During the treatment phase, closely monitor for signs of acute toxicities (eg, nausea, diarrhea, mucositis, and hemorrhagic cystitis), and give constant attention to patient.
- During the bone marrow infusions or stem cell reinfusions, monitor vital signs and blood oxygen saturation, assess for adverse effects (eg, fever, chills, shortness of breath, chest pain, cutaneous reactions, nausea, vomiting, hypotension or hypertension, tachycardia, anxiety, and taste changes), and provide ongoing support and patient teaching.
- Because of the high risk for dying from sepsis and bleeding, support patient with blood products and hemopoietic growth factors and protect from infection.

- Assess for early graft-versus-host disease (GVHD) effects on the skin, liver, and GI tract as well as GI complications (eg, fluid retention, jaundice, abdominal pain, ascites, tender and enlarged liver, and encephalopathy).
- Monitor for pulmonary complications, such as pulmonary edema, and interstitial and other pneumonias, which often complicate recovery after BMT.
- Provide for ongoing nursing assessments in follow-up visits to detect late effects (100 days or later) after BMT, such as infections (eg, varicella zoster), restrictive pulmonary abnormalities, and recurrent pneumonias, as well as chronic GVHD involving the skin, liver, intestine, esophagus, eye, lungs, joints, and vaginal mucosa. Cataracts may develop after total body irradiation.
- Provide ongoing psychosocial patient assessment, including the stressors affecting patients at each phase of the transplantation experience.
- Assess and address the psychosocial needs of marrow donors and family members. Educate and support donor and family members to reduce anxiety and promote coping. Assist family members to maintain realistic expectations of themselves as well as of the patients.

Hyperthermia

- Explain to patient and family about the procedure, its goals, and its effects.
- Assess the patient for adverse effects, and make efforts to reduce their occurrence and severity.
- Provide local skin care at the site of the implanted hyperthermic probes.

Biologic Response Modifiers

- Assess the need for education, support, and guidance for both patient and family (often the same needs as patients having other treatment approaches, but BRMs may be perceived as a last-chance effort by patients who have not responded to standard treatments).
- Monitor therapeutic and adverse effects (eg, fever, myalgia, nausea, and vomiting, as seen with interferon therapy) and life-threatening side effects (eg, capillary leak syndrome, pulmonary edema, and hypotension).

- Teaches self-care and assist in providing for continuing care.
- Teach patients and families, as needed, how to administer BRM agents through subcutaneous injections.
- Provides instructions about side effects and help the patient and family identify strategies to manage many of the common side effects of BRM therapy (eg, fatigue, anorexia, flu-like symptoms).
- Arrange for home care nurses to monitor patient's responses to treatment, and provide teaching and continued care.

For more information, see Chapter 16 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cancer of the Bladder

Cancer of the urinary bladder is more common in people older than 55 years, affects men more often than women (4:1), and is more common in Caucasians than in African Americans. Bladder tumors usually arise at the base of the bladder and involve the ureteral orifices and bladder neck. Tobacco use continues to be a leading risk factor for all urinary tract cancers. People who smoke develop bladder cancer twice as often as those who do not smoke. Cancers arising from the prostate, colon, and rectum in males and from the lower gynecologic tract in females may metastasize to the bladder.

Clinical Manifestations

- Visible, painless hematuria is the most common symptom.
- Infection of the urinary tract is common and produces frequency and urgency.
- Any alteration in voiding or change in the urine is indicative.
- Pelvic or back pain may occur with metastasis.

Assessment and Diagnostic Methods

Biopsies of the tumor and adjacent mucosa are definitive, but the following procedures are also used:

- Cystoscopy (the mainstay of diagnosis)
- Excretory urography
- CT scan
- Ultrasonography
- Bimanual examination under anesthesia
- Cytologic examination of fresh urine and saline bladder washings

Newer diagnostic tools such as bladder tumor antigens, nuclear matrix proteins, adhesion molecules, cytoskeletal proteins, and growth factors are being studied.

Medical Management

Treatment of bladder cancer depends on the grade of tumor, the stage of tumor growth, and the multicentricity of the tumor. Age and physical, mental, and emotional status are considered in determining treatment.

Surgical Management

- Transurethral resection (TUR) or fulguration for simple papillomas with intravesical bacille Calmette–Guérin (BCG) is the treatment of choice.
- Monitoring of benign papillomas with cytology and cystoscopy periodically for the rest of patient's life.
- Simple cystectomy or radical cystectomy for invasive or multifocal bladder cancer.
- Trimodal therapy (TUR, radiation, and chemotherapy) to avoid cystectomy remains investigational in the United States.

Pharmacologic Therapy

- Chemotherapy with a combination of methotrexate (Rheumatrex), 5-fluorouracil (5-FU), vinblastine (Velban), doxorubicin (Adriamycin), and cisplatin (Platinol) has been effective in producing partial remission of transitional cell carcinoma of the bladder in some patients.
- Intravesical BCG (effective with superficial transitional cell carcinoma).

C

Radiation Therapy

- Radiation of tumor preoperatively to reduce microextension and viability
- Radiation therapy in combination with surgery to control inoperable tumors
- Hydrostatic therapy: for advanced bladder cancer or patients with intractable hematuria (after radiation therapy)
- Formalin, phenol, or silver nitrate instillations to achieve relief of hematuria and strangury (slow and painful discharge of urine) in some patients

Investigational Therapy

The use of photodynamic techniques in treating superficial bladder cancer is under investigation.

Nursing Management

See "Nursing Management" for the patient undergoing cancer surgery, radiation, and chemotherapy under "Cancer" for additional information.

For more information, see Chapter 45 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cancer of the Breast

Cancer of the breast is a pathologic entity that starts with a genetic alteration in a single cell and may take several years to become palpable. The most common histologic type of breast cancer is infiltrating ductal carcinoma (80% of cases), whereby tumors arise from the duct system and invade the surrounding tissues. Infiltrating lobular carcinoma accounts for 10% to 15% of cases. These tumors arise from the lobular epithelium and typically occur as an area of ill-defined thickening in the breast. Infiltrating ductal and lobular carcinomas usually spread to bone, lung, liver, adrenals, pleura, skin, or brain. Several less common invasive cancers, such as medullary carcinoma (5% of cases), mucinous carcinoma (3% of cases), and tubular ductal carcinoma (2% of cases) have

very favorable prognoses. Inflammatory carcinoma and Paget's disease are less common forms of breast cancer. Ductal carcinoma in situ is a noninvasive form of cancer (also called intraductal carcinoma), but if left untreated, there is an increased likelihood that it will progress to invasive cancer. There is no one specific cause of breast cancer; rather, a combination of genetic, hormonal, and possibly environmental events may contribute to its development. If lymph nodes are unaffected, the prognosis is better. The key to improved cure rates is early diagnosis, before metastasis.

Risk Factors

- Gender (female) and increasing age.
- Previous breast cancer: The risk of developing cancer in the same or opposite breast is significantly increased.
- Family history: Having first-degree relative with breast cancer (mother, sister, daughter) increases the risk twofold; having two first-degree relatives increases the risk fivefold.
- Genetic mutations (*BRCA1* or *BRCA2*) account for majority of inherited breast cancers.
- Hormonal factors: early menarche (before 12 years of age), nulliparity, first birth after 30 years of age, late menopause (after 55 years of age), and hormone therapy (formerly referred to as hormone replacement therapy).
- Other factors may include exposure to ionizing radiation during adolescence and early adulthood obesity, alcohol intake (beer, wine, or liquor), high-fat diet (controversial, more research needed).

Protective Factors

Protective factors may include regular vigorous exercise (decreased body fat), pregnancy before age 30 years, and breastfeeding.

Prevention Strategies

Patients at high risk for breast cancer may consult with specialists regarding possible or appropriate prevention strategies such as the following:

- Long-term surveillance consisting of twice-yearly clinical breast examinations starting at age 25 years, yearly mammography, and possibly MRI (in *BRCA1* and *BRCA2* carriers)

- Chemoprevention to prevent disease before it starts, using tamoxifen (Nolvadex) and possibly raloxifene (Evista)
- Prophylactic mastectomy ("risk-reducing" mastectomy) for patients with strong family history of breast cancer, a diagnosis of lobular carcinoma in situ (LCIS) or atypical hyperplasia, a *BRCA* gene mutation, an extreme fear of cancer ("cancer phobia"), or previous cancer in one breast

Clinical Manifestations

- Generally, lesions are nontender, fixed, and hard with irregular borders; most occur in the upper outer quadrant.
- Some women have no symptoms and no palpable lump but have an abnormal mammogram.
- Advanced signs may include skin dimpling, nipple retraction, or skin ulceration.

Assessment and Diagnostic Methods

- Biopsy (eg, percutaneous, surgical) and histologic examination of cancer cells.
- Tumor staging and analysis of additional prognostic factors are used to determine the prognosis and optimal treatment regimen.
- Chest x-rays, CT, MRI, PET scan, bone scans, and blood work (complete blood cell count, comprehensive metabolic panel, tumor markers [ie, carcinoembryonic antigen (CEA), CA15-3]).

Staging of Breast Cancer

Classifying tumors as stage 0, I, or IV is fairly straightforward. Stage II and III tumors represent a wide spectrum of breast cancers and are subdivided into stage IIA, IIB, IIIA, IIIB, and IIIC. Factors determining stages include number and characteristics of axillary lymph nodes, status of other regional lymph nodes, and involvement of the skin or underlying muscle. See "Staging" under "Cancer."

Medical Management

Various management options are available. The patient and physician may decide on surgery, radiation therapy, chemotherapy, or hormonal therapy or a combination of therapies.

- Modified radical mastectomy involves removal of the entire breast tissue, including the nipple–areola complex and a portion of the axillary lymph nodes.
- Total mastectomy involves removal of the breast and nipple–areola complex but does not include axillary lymph node dissection (ALND).
- Breast-conserving surgery: lumpectomy, wide excision, partial or segmental mastectomy, quadrantectomy followed by lymph node removal for invasive breast cancer.
- Sentinel lymph node biopsy: considered a standard of care for the treatment of early-stage breast cancer.
- External-beam radiation therapy: typically whole breast radiation, but partial breast radiation (radiation to the lumpectomy site alone) is now being evaluated at some institutions in carefully selected patients.
- Chemotherapy to eradicate micrometastatic spread of the disease: cyclophosphamide (Cytoxan), methotrexate, fluorouracil, anthracycline-based regimens (eg, doxorubicin [Adriamycin], epirubicin [Ellence]), taxanes (paclitaxel [Taxol], docetaxel [Taxotere]).
- Hormonal therapy based on the index of estrogen and progesterone receptors: Tamoxifen (Soltamox) is the primary hormonal agent used to suppress hormonal-dependent tumors; others are inhibitors anastrazole (Arimidex), letrozole (Femara), and exemestane (Aromasin).
- Targeted therapy: trastuzumab (Herceptin), bevacizumab (Avastin).
- Breast reconstruction.

NURSING PROCESS

The Patient Undergoing Surgery for Breast Cancer

See “Nursing Management” under “Cancer” for additional information.

Assessment

- Perform a health history.
- Assess the patient’s reaction to the diagnosis and ability to cope with it.

- Ask about coping skills, support systems, knowledge deficit, and presence of discomfort.

Diagnosis

Preoperative Nursing Diagnoses

- Deficient knowledge about the planned surgical treatments
- Anxiety related to cancer diagnosis
- Fear related to specific treatments and body image changes
- Risk for ineffective coping (individual or family) related to the diagnosis of breast cancer and treatment options
- Decisional conflict related to treatment options

Postoperative Nursing Diagnoses

- Pain and discomfort related to surgical procedure
- Disturbed sensory perception related to nerve irritation in affected arm, breast, or chest wall
- Disturbed body image related to loss or alteration of the breast
- Risk for impaired adjustment related to the diagnosis of cancer and surgical treatment
- Self-care deficit related to partial immobility of upper extremity on operative side
- Risk for sexual dysfunction related to loss of body part, change in self-image, and fear of partner's responses
- Deficient knowledge: drain management after breast surgery
- Deficient knowledge: arm exercises to regain mobility of affected extremity
- Deficient knowledge: hand and arm care after an ALND

Collaborative Problems/Potential Complications

- Lymphedema
- Hematoma/seroma formation
- Infection

Planning and Goals

The major goals may include increased knowledge about the disease and its treatment; reduction of preoperative and postoperative fear, anxiety, and emotional stress; improvement of

decision-making ability; pain management; improvement in coping abilities; improvement in sexual function; and the absence of complications.

Preoperative Nursing Interventions

Providing Education and Preparation about Surgical Treatments

- Review treatment options by reinforcing information provided to the patient and answer any questions.
- Fully prepare the patient for what to expect before, during, and after surgery.
- Inform patient that she will often have decreased arm and shoulder mobility after an ALND; demonstrate range-of-motion exercises prior to discharge.
- Reassure patient that appropriate analgesia and comfort measures will be provided.

Reducing Fear and Anxiety and Improving Coping Ability

- Help patient cope with the physical and emotional effects of surgery.
- Provide patient with realistic expectations about the healing process and expected recovery to help alleviate fears (eg, fear of pain, concern about inability to care for oneself and one's family).
- Inform patient about available resources at the treatment facility as well as in the breast cancer community (eg, social workers, psychiatrists, and support groups); patient may find it helpful to talk to a breast cancer survivor who has undergone similar treatments.

Promoting Decision-Making Ability

- Help patient and family weigh the risks and benefits of each option.
- Ask patient questions about specific treatment options to help her focus on choosing an appropriate treatment (eg, How would you feel about losing your breast? Are you considering breast reconstruction? If you choose to retain your breast, would you consider undergoing radiation treatments 5 days a week for 5 to 6 weeks?).
- Support whatever decision the patient makes.

Postoperative Nursing Interventions

Relieving Pain and Discomfort

- Carefully assess patient for pain; individual pain varies.
- Encourage patient to use analgesics.
- Prepare patient for a possible slight increase in pain after the first few days of surgery; this may occur as patients regain sensation around the surgical site and become more active.
- Evaluate patients who complain of excruciating pain to rule out any potential complications such as infection or a hematoma.
- Suggest alternative methods of pain management (eg, taking warm showers, using distraction methods such as guided imagery).

Managing Postoperative Sensations

Reassure patients that postoperative sensations (eg, tenderness, soreness, numbness, tightness, pulling, and twinges; phantom sensations after a mastectomy) are a normal part of healing and that these sensations are not indicative of a problem.

Promoting Positive Body Image

- Assess the patient's readiness to see the incision for the first time and provide gentle encouragement; ideally, the patient will be with the nurse or another health care provider for support.
- Maintain the patient's privacy.
- Ask the patient what she perceives, acknowledge her feelings, and allow her to express her emotions; reassure patient that her feelings are normal.
- If desired, provide patient who has not had immediate reconstruction with a temporary breast form to place in her bra.

Promoting Positive Adjustment and Coping

- Provide ongoing assessment of how the patient is coping with her diagnosis and treatment.
- Assist patient in identifying and mobilizing her support systems; the patient's spouse or partner may also need guidance, support, and education; provide resources (eg, Reach to Recovery program of the American

Cancer Society [ACS], advocacy groups, or a spiritual advisor).

- Encourage the patient to discuss issues and concerns with other patients who have had breast cancer.
- Provide patient with information about the plan of care after treatment.
- If patient displays ineffective coping, consultation with a mental health practitioner may be indicated.

Improving Sexual Function

- Encourage the patient to discuss how she feels about herself and about possible reasons for a decrease in libido (eg, fatigue, anxiety, self-consciousness).
- Suggest that the patient vary the time of day for sexual activity (when the patient is less tired), assume positions that are more comfortable, and express affection using alternative measures (eg, hugging, kissing, manual stimulation).
- If sexual issues cannot be resolved, a referral for counseling (eg, psychologist, psychiatrist, psychiatric clinical nurse specialist, social worker, sex therapist) may be helpful.

Monitoring and Managing Potential Complications

- Promote collateral or auxiliary lymph drainage by encouraging movement and exercise (eg, hand pumps) through postoperative education.
- Elevate arm above the heart.
- Obtain referral for patient to therapist for compression sleeve and/or glove, exercises, manual lymph drainage, and a discussion of ways to modify daily activities.
- Teach patient proper incision care and signs and symptoms of infection and when to contact surgeon or nurse.
- Monitor surgical site for gross swelling or drainage output, and notify surgeon promptly.
- If ordered, apply compression wrap to the incision.

Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE

- Assess patient's readiness to assume self-care. Focus on teaching incision care, signs to report (infection, hematoma/seroma, arm swelling), pain management, arm exercises, hand and arm care, drainage management, and activity restriction. Include family member.

- Provide follow-up with telephone calls to discuss concerns about incision, pain management, and patient and family adjustment.

CONTINUING CARE

- Reinforce earlier teaching as needed.
- Encourage patient to call with any questions or concerns.
- Refer patient for home care as indicated or desired by patient.
- Remind patient of the importance of participating in routine health screening.
- Reinforce need for follow-up visits to the physician (every 3 to 6 months for the first several years).

Evaluation

Expected Patient Outcomes

- Exhibits knowledge about diagnosis and treatment options
- Verbalizes willingness to deal with anxiety and fears
- Demonstrates ability to cope with diagnosis and treatment
- Makes decisions regarding treatment options in a timely manner
- Reports pain has decreased and states pain management strategies
- Identifies postoperative sensations and recognizes that they are a normal part of healing
- Exhibits clean, dry, and intact surgical incision without signs of inflammation or infection
- Lists signs and symptoms of infection to be reported
- Verbalizes feelings regarding change in body image
- Participates actively in self-care activities
- Demonstrates knowledge of postdischarge recommendations and restrictions
- Experiences no complications

For more information, see Chapter 48 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cancer of the Cervix

Cancer of the cervix is predominantly squamous cell cancer and also includes adenocarcinomas. It is less common than it once was because of early detection by the Pap test, but it remains the third most common reproductive cancer in women and is estimated to affect more than 11,000 women in the United States every year. Risk factors vary from multiple sex partners to smoking to chronic cervical infection (exposure to human papillomavirus [HPV]).

Clinical Manifestations

- Cervical cancer is most often asymptomatic. When discharge, irregular bleeding, or pain or bleeding after sexual intercourse occurs, the disease may be advanced.
- Vaginal discharge gradually increases in amount, becomes watery, and finally is dark and foul smelling because of necrosis and infection of the tumor.
- Bleeding occurs at irregular intervals between periods or after menopause, may be slight (enough to spot undergarments), and is usually noted after mild trauma (intercourse, douching, or defecation). As disease continues, bleeding may persist and increase.
- Leg pain, dysuria, rectal bleeding, and edema of the extremities signal advanced disease.
- Nerve involvement, producing excruciating pain in the back and legs, occurs as cancer advances and tissues outside the cervix are invaded, including the fundus and lymph glands anterior to the sacrum.
- Extreme emaciation and anemia, often with fever due to secondary infection and abscesses in the ulcerating mass, and fistula formation may occur in the final stage.

Assessment and Diagnostic Findings

- Pap smear and biopsy results show severe dysplasia, high-grade epithelial lesion (HGSIL), or carcinoma in situ.
- Other tests may include x-rays, laboratory tests, special examinations (eg, punch biopsy and colposcopy), dilation and curettage (D & C), CT scan, MRI, IV urography, cystography, PET, and barium x-ray studies.

Medical Management

Disease may be staged (usually TNM system) to estimate the extent of the disease so that treatment can be planned more specifically and prognosis.

- Conservative treatments include monitoring, cryotherapy (freezing with nitrous oxide), laser therapy, loop electrosurgical excision procedure (LEEP), or conization (removing a cone-shaped portion of cervix).
- Simple hysterectomy if preinvasive cervical cancer (carcinoma in situ) occurs when a woman has completed childbearing. Radical trachelectomy is an alternative to hysterectomy.
- For invasive cancer, surgery, radiation (external beam or brachytherapy), platinum-based agents, or a combination of these approaches may be used.
- For recurrent cancer, pelvic exenteration is considered.

NURSING PROCESS

The Patient Undergoing Hysterectomy

See "Nursing Process: The Patient With Cancer" under "Cancer" for additional care measures and nursing care of patients with varied treatment regimens.

Assessment

- Obtain a health history.
- Perform a physical and pelvic examination and laboratory studies.
- Gather data about the patient's psychosocial supports and responses.

Diagnosis

Nursing Diagnoses

- Anxiety related to the diagnosis of cancer, fear of pain, perceived loss of femininity, or childbearing potential
- Disturbed body image related to altered fertility, fears about sexuality, and relationships with partner and family
- Pain related to surgery and other adjuvant therapy

- Deficient knowledge of perioperative aspects of hysterectomy and self-care

Collaborative Problems/Potential Complications

- Hemorrhage
- Deep vein thrombosis
- Bladder dysfunction
- Infection

Planning and Goals

The major goals may include relief of anxiety, acceptance of loss of the uterus, absence of pain or discomfort, increased knowledge of self-care requirements, and absence of complications.

Nursing Interventions

Relieving Anxiety

Determine how this experience affects the patient and allow the patient to verbalize feelings and identify strengths. Explain all pre- and postoperative and recovery period preparations and procedures.

Improving Body Image

- Assess how patient feels about undergoing a hysterectomy related to the nature of diagnosis, significant others, religious beliefs, and prognosis.
- Acknowledge patient's concerns about ability to have children, loss of femininity, and impact on sexual relations.
- Educate patient about sexual relations: sexual satisfaction, orgasm arises from clitoral stimulation, sexual feeling, or comfort related to shortened vagina.
- Explain that depression and heightened emotional sensitivity are expected because of upset hormonal balances.
- Exhibit interest, concern, and willingness to listen to fears.

Relieving Pain

- Assess the intensity of the patient's pain and administer analgesics.
- Encourage patient to resume intake of food and fluids gradually when peristalsis is auscultated (1 to 2 days). Encourage early ambulation.

- Apply heat to abdomen or insert a rectal tube if prescribed for abdominal distention.

Monitoring and Managing Complications

- Hemorrhage: Count perineal pads used and assess extent of saturation; monitor vital signs; check abdominal dressings for drainage; give guidelines for restricting activity to promote healing and prevent bleeding.
- Deep vein thrombosis: Apply elastic compression stockings; encourage and assist in changing positions frequently; assist with early ambulation and leg exercises; monitor leg pain; instruct patient to avoid prolonged pressure at the knees (sitting) and immobility.
- Bladder dysfunction: Monitor urinary output and assess for abdominal distention after catheter is removed; initiate measures to encourage voiding.

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE

- Tailor information according to patient's needs: no menstrual cycles, need for hormones.
- Instruct patient to check surgical incision daily and report redness, purulent drainage, or discharge.
- Stress the importance of adequate oral intake and maintaining bowel and urinary tract function.
- Instruct patient to resume activities gradually; no sitting for long periods; postoperative fatigue should gradually decrease.
- Teach that showers are preferable to tub baths to reduce risk for infection and injury getting in and out of tub.
- Avoid lifting, straining, sexual intercourse, or driving until advised by physician.
- Report vaginal discharge, foul odor, excessive bleeding, leg redness or pain, or elevated temperature to health care professional promptly.

CONTINUING CARE

- Make follow-up telephone contact with patient to address concerns and determine progress; remind patient about postoperative follow-up appointments.
- Remind patient to discuss hormone therapy with primary physician, if ovaries were removed.

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Evaluation

Expected Patient Outcomes

- Experiences decreased anxiety
- Has improved body image
- Experiences minimal pain and discomfort
- Verbalizes knowledge and understanding of self-care
- Experiences no complications

For more information, see Chapter 47 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cancer of the Colon and Rectum (Colorectal Cancer)

Colorectal cancer is predominantly (95%) adenocarcinoma, with colon cancer affecting more than twice as many people as rectal cancer. It may start as a benign polyp but may become malignant, invade and destroy normal tissues, and extend into surrounding structures. Cancer cells may migrate away from the primary tumor and spread to other parts of the body (most often to the liver, peritoneum, and lungs). Incidence increases with age (the incidence is highest in people older than 85 years) and is higher in people with a family history of colon cancer and those with inflammatory bowel disease (IBD) or polyps. If the disease is detected and treated at an early stage before the disease spreads, the 5-year survival rate is 90%; however, only 39% of colorectal cancers are detected at an early stage. Survival rates after late diagnosis are very low.

Clinical Manifestations

- Changes in bowel habits (most common presenting symptom), passage of blood in or on the stools (second most common symptom).
- Unexplained anemia, anorexia, weight loss, and fatigue.
- Right-sided lesions are possibly accompanied by dull abdominal pain and melena (black tarry stools).

- Left-sided lesions are associated with obstruction (abdominal pain and cramping, narrowing stools, constipation, and distention) and bright red blood in stool.
- Rectal lesions are associated with tenesmus (ineffective painful straining at stool), rectal pain, feeling of incomplete evacuation after a bowel movement, alternating constipation and diarrhea, and bloody stool.
- Signs of complications: partial or complete bowel obstruction, tumor extension and ulceration into the surrounding blood vessels (perforation, abscess formation, peritonitis, sepsis, or shock).
- In many instances, symptoms do not develop until colorectal cancer is at an advanced stage.

Assessment and Diagnostic Methods

- Abdominal and rectal examination; fecal occult blood testing; barium enema; proctosigmoidoscopy; and colonoscopy, biopsy, or cytology smears.
- CEA studies should return to normal within 48 hours of tumor excision (reliable in predicting prognosis and recurrence).

Gerontologic Considerations

The incidence of carcinoma of the colon and rectum increases with age. These cancers are considered common malignancies in advanced age. In men, only the incidence of prostate cancer and lung cancer exceeds that of colorectal cancer. In women, only the incidence of breast cancer exceeds that of colorectal cancer. Symptoms are often insidious. Patients with colorectal cancer usually report fatigue, which is caused primarily by iron deficiency anemia. In early stages, minor changes in bowel patterns and occasional bleeding may occur. The later symptoms most commonly reported by the elderly are abdominal pain, obstruction, tenesmus, and rectal bleeding.

Colon cancer in the elderly has been closely associated with dietary carcinogens. Lack of fiber is a major causative factor because the passage of feces through the intestinal tract is prolonged, which extends exposure to possible carcinogens. Excess dietary fat, high alcohol consumption, and smoking all

increase the incidence of colorectal tumors. Physical activity and dietary folate have protective effects.

Medical Management

Treatment of cancer depends on the stage of disease and related complications. Obstruction is treated with IV fluids and nasogastric suction and with blood therapy if bleeding is significant. Supportive therapy and adjuvant therapy (eg, chemotherapy, radiation therapy, immunotherapy) are included.

Surgical Management

- Surgery is the primary treatment for most colon and rectal cancers; the type of surgery depends on the location and size of tumor, and it may be curative or palliative.
- Cancers limited to one site can be removed through a colonoscope.
- Laparoscopic colotomy with polypectomy minimizes the extent of surgery needed in some cases.
- Neodymium:yttrium-aluminum-garnet (Nd:YAG) laser is effective with some lesions.
- Bowel resection with anastomosis and possible temporary or permanent colostomy or ileostomy (less than one third of patients) or coloanal reservoir (colonic J pouch).

NURSING PROCESS

THE PATIENT WITH COLORECTAL CANCER

Assessment

- Obtain a health history about the presence of fatigue, abdominal or rectal pain, past and present elimination patterns, and characteristics of stool.
- Obtain a history of IBD or colorectal polyps, a family history of colorectal disease, and current medication therapy.
- Assess dietary patterns, including fat and fiber intake, amounts of alcohol consumed, and history of smoking; describe and document a history of weight loss and feelings of weakness and fatigue.

- Auscultate abdomen for bowel sounds; palpate for areas of tenderness, distention, and solid masses; inspect stool for blood.

Diagnosis

Nursing Diagnoses

- Imbalanced nutrition: less than body requirements related to nausea and anorexia
- Risk for deficient fluid volume related to vomiting and dehydration
- Anxiety related to impending surgery and diagnosis of cancer
- Risk for ineffective therapeutic regimen management related to deficient knowledge concerning the diagnosis, surgical procedure, and self-care after discharge
- Impaired skin integrity related to surgical incisions, stoma, and fecal contamination of peristomal skin
- Disturbed body image related to colostomy
- Ineffective sexuality patterns related to ostomy and self-concept

Collaborative Problems/Potential Complications

- Intraperitoneal infection
- Complete large bowel obstruction
- Gastrointestinal bleeding and hemorrhage
- Bowel perforation
- Peritonitis, abscess, sepsis

Planning and Goals

The major goals may include attainment of optimal level of nutrition; maintenance of fluid and electrolyte balance; reduction of anxiety; learning about the diagnosis, surgical procedure, and self-care after discharge; maintenance of optimal tissue healing; protection of peristomal skin; learning how to irrigate the colostomy (sigmoid colostomies) and change the appliance; expressing feelings and concerns about the colostomy and the impact on self; and avoidance of complications.

Nursing Interventions

Preparing Patient for Surgery

- Physically prepare patient for surgery (diet high in calories, protein, and carbohydrates and low in residue;

full liquid diet 24 to 48 hours before surgery or parenteral nutrition [PN] if prescribed).

- Administer antibiotics, laxatives, enemas, or colonic irrigations as prescribed.
- Perform intake and output measurement of hospitalized patient (including vomitus); nasogastric tube and IV fluid and electrolyte management.
- Observe for signs of hypovolemia (eg, tachycardia, hypotension, decreased pulse volume); monitor hydration status (eg, skin turgor, mucous membranes).
- Monitor for signs of obstruction or perforation (increased abdominal distention, loss of bowel sounds, pain, or rigidity).
- Reinforce and supplement patient's knowledge about diagnosis, prognosis, surgical procedure, and expected level of function postoperatively. Include information about postoperative wound and ostomy care, dietary restrictions, pain control, and medical management.
- See "Nursing Management" under "Cancer" for additional information.

Providing Emotional Support

- Assess patient's level of anxiety and coping mechanisms and suggest methods for reducing anxiety, such as deep breathing exercises and visualizing a successful recovery from surgery and cancer.
- Arrange meetings with a spiritual advisor, if desired.
- Provide meetings for patient and family with physicians and nurses to discuss treatment and prognosis; a meeting with an enterostomal therapist may be useful.
- Help reduce fear by presenting facts about the surgical procedure and the creation and management of the ostomy.

Maintaining Optimal Nutrition

- Teach about the health benefits of a healthy diet; diet is individualized as long as it is nutritionally sound and does not cause diarrhea or constipation.
- Advise patient to avoid foods that cause excessive odor and gas, including foods in the cabbage family, eggs, asparagus, fish, beans, and high-cellulose products such as

peanuts; nonirritating foods are substituted for those that are restricted so that deficiencies are corrected.
- Suggest fluid intake of at least 2 L per day.

Maintaining Fluid and Electrolyte Balance

- Administer antiemetics and restrict fluids and food to prevent vomiting; monitor abdomen for distention, loss of bowel sounds, or pain or rigidity (signs of obstruction or perforation).
- Record intake and output, and restrict fluids and oral food to prevent vomiting.
- Monitor serum electrolytes to detect hypokalemia and hyponatremia.
- Assess vital signs to detect signs of hypovolemia: tachycardia, hypotension, and decreased pulse volume.
- Assess hydration status and report decreased skin turgor, dry mucous membranes, and concentrated urine.

Supporting a Positive Body Image

- Encourage patient to verbalize feelings and concerns.
- Provide a supportive environment and attitude to promote adaptation to lifestyle changes related to stoma care.
- Listen to the patient's concerns about sexuality and function (eg, mutilation, fear of impotence, leakage during sex). Offer support and, if appropriate, refer to an enterostomal therapist, sex counselor or therapist, or advanced practice nurse.

Monitoring and Managing Complications

- Before and after surgery, observe for symptoms of complications; report; and institute necessary care.
- Administer antibiotics as prescribed to reduce intestinal bacteria in preparation for bowel surgery.
- Postoperatively, examine wound dressing frequently during first 24 hours, checking for infection, dehiscence, hemorrhage, and excessive edema.

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE

- Assess patient's need and desire for information, and provide information to patient and family (see "Providing

Emotional Support" earlier under "Nursing Interventions").
- Provide patients being discharged with specific information relevant to their needs.
- If patient has an ostomy, include information about ostomy care and complications to observe for, including obstruction, infection, stoma stenosis, retraction or prolapse, and peristomal skin irritation.
- Provide dietary instructions to help patient identify and eliminate foods that can cause diarrhea or constipation.
- Provide patient with a list of prescribed medications, with information on action, purpose, and possible side effects.
- Demonstrate and review treatments and dressing changes, stoma care, and ostomy irrigations, and encourage family to participate.
- Provide patient with specific directions about when to call the physician and what complications require prompt attention (eg, bleeding, abdominal distention and rigidity, diarrhea, fever, wound drainage, and disruption of suture line).
- Review side effects of radiation therapy (anorexia, vomiting, diarrhea, and exhaustion) if necessary.
- Refer patient for home nursing care as indicated.

Evaluation

Expected Patient Outcomes

- Consumes a healthy diet and maintains fluid balance
- Experiences reduced anxiety
- Learns about diagnosis, surgical procedure, preoperative preparation, and self-care after discharge
- Maintains clean incision, stoma, and perineal wound
- Verbalizes feelings and concerns about self
- Recovers without complications

For more information, see Chapter 38 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cancer of the Endometrium

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Cancer of the uterine endometrium (fundus or corpus) is the fourth most common cancer in women. Most uterine cancers are endometrioid (ie, originating in the lining of the uterus). Type 1, which accounts for the majority of cases, is estrogen related and occurs in younger, obese, and perimenopausal women. It is usually low grade and endometrioid. Type 2, which occurs in about 10% of cases, is high grade and usually serous cell or clear cell. It affects older women and African American women. Type 3, which also occurs in about 10% of cases, is the hereditary or genetic types, some of which are related to the Lynch II syndrome. (This syndrome is associated with the occurrence of breast, ovarian, colon, endometrial, and other cancers throughout a family.) Cumulative exposure to estrogen is considered the major risk factor. Other risk factors include age above 55 years, obesity, early menarche, late menopause, nulliparity, anovulation, infertility, and diabetes, as well as use of tamoxifen.

Clinical Manifestations

Irregular bleeding and postmenopausal bleeding raise suspicion of endometrial cancer.

Assessment and Diagnostic Methods

- Annual checkups and gynecologic examination.
- Endometrial aspiration or biopsy is performed with perimenopausal or menopausal bleeding.
- Ultrasonography.

Medical Management

Treatment consists of total or radical hysterectomy and bilateral salpingo-oophorectomy and node sampling. CA125 levels need to be monitored because elevated levels are a significant predictor of extrauterine disease or metastasis. Adjuvant radiation may be used in a patient who is considered high risk. Recurrent lesions in the vagina are treated with surgery and radiation. Recurrent lesions beyond the vagina are treated with hormonal therapy or chemotherapy. Progestin therapy is used frequently.

Nursing Management

See “Nursing Management” under “Cancer of the Cervix” for additional information.

For more information, see Chapter 47 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cancer of the Esophagus

Carcinoma of the esophagus is usually of the squamous cell epidermoid type; the incidence of adenocarcinoma of the esophagus is increasing in the United States. Tumor cells may involve the esophageal mucosa and muscle layers and can spread to the lymphatics; in later stages, they may obstruct the esophagus, perforate the mediastinum, or erode into the great vessels.

Risk Factors

- Gender (male).
- Race (African American).
- Age (greater risk in fifth decade of life).
- Geographic locale (much higher incidence in China and northern Iran).
- Chronic esophageal irritation.
- Use of alcohol and tobacco.
- Gastroesophageal reflux disease (GERD).
- Other factors may include chronic ingestion of hot liquids or foods, nutritional deficiencies, poor oral hygiene, and exposure to nitrosamines in the environment or food.

Clinical Manifestations

- Patient usually presents with an advanced ulcerated lesion of the esophagus.
- Dysphagia, first with solid foods and eventually liquids.
- Feeling of a lump in the throat and painful swallowing.
- Substernal pain or fullness; regurgitation of undigested food with foul breath and hiccups later.
- Hemorrhage; progressive loss of weight and strength from inadequate nutrition.

Assessment and Diagnostic Methods

Esophagogastroduodenoscopy (EGD) with biopsy and brushings confirms the diagnosis most often. Other studies include CT, PET, endoscopic ultrasound (EUS), and exploratory laparoscopy.

Medical Management

Treatment of esophageal cancer is directed toward cure if cancer is in early stage; in late stages, palliation is the goal of therapy. Each patient is approached in a way that appears best for him or her.

- Surgery (eg, esophagectomy), radiation, chemotherapy, or a combination of these modalities, depending on extent of disease
- Palliative treatment to maintain esophageal patency: dilation of the esophagus, laser therapy, placement of an endoprosthesis (stent), radiation, and chemotherapy

Nursing Management

See "Nursing Process: The Patient With Cancer" under "Cancer" for additional information. Intervention for esophageal cancer is directed toward improving the patient's nutritional and physical status in preparation for surgery, radiation therapy, or chemotherapy.

- Implement program to promote weight gain based on a high-calorie and high-protein diet, in liquid or soft form, if adequate food can be taken by mouth. If this is not possible, initiate parenteral or enteral nutrition.
- Monitor nutritional status throughout treatment.
- Inform patient about the nature of the postoperative equipment that will be used, including that required for closed chest drainage, nasogastric suction, parenteral fluid therapy, and gastric intubation.
- Immediate postoperative care is similar to that provided for patients undergoing thoracic surgery: Place patient in a low Fowler's position after recovery from anesthesia and later in a Fowler's position.
- Observe patient carefully for regurgitation and dyspnea.
- Implement vigorous pulmonary plan of care that includes incentive spirometry, sitting up in a chair, and, if necessary,

nebulizer treatments; avoid chest physiotherapy due to the risk of aspiration.

- Monitor the patient's temperature to detect any elevation that may indicate an esophageal leak.
- Monitor for and treat cardiac complications.
- Once feeding begins, encourage the patient to swallow small sips of water. Eventually, the diet is advanced as tolerated to a soft, mechanical diet; discontinue parenteral fluids when appropriate.
- Have patient remain upright for at least 2 hours after eating to allow the food to move through the GI tract.
- Family involvement and home-cooked favorite foods may help the patient to eat; antacids may help patients with gastric distress; metoclopramide (Reglan) is useful in promoting gastric motility.
- If esophagitis occurs, liquid supplements may be more easily tolerated (avoid supplements such as Boost and Ensure because they promote vagotomy syndrome [dumping syndrome]).
- Provide oral suction if the patient cannot handle oral secretions, or place a wick-type gauze at the corner of the mouth to direct secretions to a dressing or emesis basin.
- When the patient is ready to go home, instruct the family about how to promote nutrition, what observations to make, what measures to take if complications occur, how to keep the patient comfortable, and how to obtain needed physical and emotional support.

For more information, see Chapter 35 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L, & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cancer of the Kidneys (Renal Tumors)

The most common type of renal carcinoma arises from the renal epithelium and accounts for more than 85% of all kidney tumors. These tumors may metastasize early to the lungs, bone, liver, brain, and contralateral kidney. One quarter of

patients have metastatic disease at the time of diagnosis. Risk factors include gender (male), tobacco use, occupational exposure to industrial chemicals, obesity, and dialysis.

Clinical Manifestations

- Many tumors are without symptoms and are discovered as a palpable abdominal mass on routine examination.
- The classic triad, occurring in only 10% of patients, is hematuria, pain, and a mass in the flank.
- The sign that usually first calls attention to the tumor is painless hematuria, either intermittent and microscopic or continuous and gross.
- Dull pain occurs in the back from pressure due to compression of the ureter, extension of the tumor, or hemorrhage into the kidney tissue.
- Colicky pains occur if a clot or mass of tumor cells passes down the ureter.
- Symptoms from metastasis may be the first manifestation of renal tumor, including unexplained weight loss, increasing weakness, and anemia.

Assessment and Diagnostic Methods

- IV urography
- Cystoscopic examination
- Nephrotomograms, renal angiograms
- Ultrasonography
- CT scan

Medical Management

The goal of management is to eradicate the tumor before metastasis occurs.

- Radical nephrectomy is the preferred treatment, including removal of the kidney (and tumor), adrenal gland, surrounding fat and Gerota's fascia, and lymph nodes.
- Radiation therapy, hormonal therapy, or chemotherapy may be used with surgery.
- Immunotherapy may be helpful; allogeneic stem cell transplantation may be indicated if no response to immunotherapy.
- Nephron-sparing surgery (partial nephrectomy) may be used for some patients.

- Renal artery embolization may be used in metastasis to occlude the blood supply to the tumor and kill the tumor cells. Postinfarction syndrome of flank and abdominal pain, elevated temperature, and GI complaints is treated with parenteral analgesics, antiemetics, restricted oral intake, and IV fluids.
- BRMs such as interleukin-2 (IL-2).

Nursing Management

See "Nursing Process: The Patient With Cancer" under "Cancer" for additional information.

- Monitor for infection resulting from use of immunosuppressant agents.
- After surgery, give frequent analgesia for pain and muscle soreness.
- Assist patient with turning, coughing, use of incentive spirometry, and deep breathing to prevent atelectasis and other pulmonary complications.
- Support patient and family in coping with diagnosis and uncertainties about outcome and prognosis.
- Teach patient to inspect and care for the incision and perform other general postoperative care.
- Inform patient of limitations on activities, lifting, and driving.
- Teach patient about correct use of pain medications.
- Provide instructions about follow-up care and need to notify physician about fever, breathing difficulty, wound drainage, blood in urine, pain, or swelling of the legs.
- Encourage patient to eat a healthy diet and to drink adequate liquids to avoid constipation and to maintain an adequate urine volume.
- Instruct patient and family in need for follow-up care to detect signs of metastases; evaluate all subsequent symptoms with possible metastases in mind.
- Emphasize that a yearly physical examination and chest x-ray throughout life are required for patients who have had surgery for renal carcinoma.
- With follow-up chemotherapy, educate patient and family thoroughly, including treatment plan or chemotherapy protocol, what to expect with visits, and how to notify the

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physician. Explain the need for periodic evaluation of renal function (creatinine clearance, BUN, and creatinine).

- Refer to home care nurse as needed to monitor and support patient and coordinate services and resources needed.

For more information, see Chapter 44 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cancer of the Larynx

Cancer of the larynx accounts for approximately half of all head and neck cancers. Almost all malignant tumors of the larynx arise from the surface epithelium and are classified as squamous cell carcinoma. Risk factors include male gender, age 60 to 70 years, tobacco use (including smokeless), alcohol use, vocal straining, chronic laryngitis, occupational exposure to carcinogens, nutritional deficiencies (riboflavin), and family predisposition.

Clinical Manifestations

- Hoarseness, noted early with cancer in glottic area; harsh, raspy, low-pitched voice.
- Persistent cough; pain and burning in the throat when drinking hot liquids and citrus juices.
- Lump felt in the neck.
- Late symptoms: dysphagia, dyspnea, unilateral nasal obstruction or discharge, persistent hoarseness or ulceration, and foul breath.
- Enlarged cervical nodes, weight loss, general debility, and pain radiating to the ear may occur with metastasis.

Assessment and Diagnostic Methods

- Physical examination of the head and neck
- Indirect laryngoscopy
- Endoscopy, virtual endoscopy, optical imaging, CT, MRI, and PET scanning (to detect recurrence of tumor after treatment)

- Direct laryngoscopic examination under local or general anesthesia
- Biopsy of suspicious tissue

Medical Management

- The goals of treatment of laryngeal cancer include cure, preservation of safe effective swallowing, preservation of useful voice, and avoidance of permanent tracheostoma.
- Treatment options include surgery, radiation therapy, and chemotherapy, or combinations.
- Before treatment begins, a complete dental examination is performed to rule out oral disease. Dental problems should be resolved before surgery and after radiotherapy.
- Radiation therapy provides excellent results in early-stage glottic tumors, when only one cord is affected and mobile; may be used preoperatively to reduce tumor size, combined with surgery in advanced laryngeal cancer (stages III and IV), or as a palliative measure.
- Surgical procedures for early-stage tumors may include transoral endoscopic laser resection, classic open vertical hemilaryngectomy for glottic tumors, or classic horizontal supraglottic laryngectomy.
- Other surgical options include the following:
  - Vocal cord stripping—used to treat dysplasia, hyperkeratosis, and leukoplakia and is often curative for these lesions
  - Cordectomy—for lesions limited to the middle third of the vocal cord
  - Laser surgery—for treatment of early glottic cancers
  - Partial laryngectomy—recommended in early stages of glottic cancer with only one vocal cord involved; high cure rate
  - Total laryngectomy—can provide the desired cure in most advanced stage IV laryngeal cancers, when the tumor extends beyond the vocal cords, or for cancer that recurs or persists after radiation therapy
- Speech therapy when indicated: esophageal speech, artificial larynx (electrolarynx), or tracheoesophageal puncture.

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NURSING PROCESS

The Patient Undergoing Laryngectomy

Assessment

- Obtain a health history and assesses the patient's physical, psychosocial, and spiritual domains.
- Assess for hoarseness, sore throat, dyspnea, dysphagia, or pain and burning in the throat.
- Perform a thorough head and neck examination; palpate the neck and thyroid for swelling, nodularity, or adenopathy.
- Assess patient's ability to hear, see, read, and write; evaluation by speech therapist if indicated.
- Determine nature of surgery; assess patient's psychological status; evaluate patient's and family's coping methods preoperatively and postoperatively; give effective support.

Diagnosis

Nursing Diagnoses

Based on all the assessment data, major nursing diagnoses may include the following:

- Deficient knowledge about the surgical procedure and postoperative course
- Anxiety and depression related to the diagnosis of cancer and impending surgery
- Ineffective airway clearance related to excess mucus production secondary to surgical alterations in the airway
- Impaired verbal communication related to anatomic deficit secondary to removal of the larynx and to edema
- Imbalanced nutrition: less than body requirements, related to inability to ingest food secondary to swallowing difficulties
- Disturbed body image and low self-esteem secondary to major neck surgery, change in appearance, and altered structure and function
- Self-care deficit related to pain, weakness, and fatigue; musculoskeletal impairment related to surgical procedure and postoperative course

Collaborative Problems/Potential Complications

Based on assessment data, potential complications that may develop include the following:

- Respiratory distress (hypoxia, airway obstruction, tracheal edema)
- Hemorrhage, infection, wound breakdown
- Aspiration
- Tracheostomal stenosis

Planning and Goals

The major goals for the patient may include knowledge about treatment, reduced anxiety, maintenance of a patent airway, effective use of alternative means of communication, optimal levels of nutrition and hydration, improvement in body image and self-esteem, improved self-care management, and absence of complications.

Nursing Interventions

Teaching the Patient Preoperatively

- Clarify any misconceptions, and give patient and family educational materials about surgery (written and audiovisual) for review and reinforcement.
- Explain to patient that natural voice will be lost if complete laryngectomy is planned.
- Assure patient that much can be done through training in a rehabilitation program.
- Review equipment and treatments that will be part of postoperative care.
- Teach coughing and deep breathing exercises; provide for return demonstration.

Reducing Anxiety and Depression

- Assess patient's psychological preparation, and give patient and family opportunity to verbalize feelings and share perceptions; give patient and family complete, concise answers to questions.
- Arrange a visit from a postlaryngectomy patient to help patient cope with situation and know that rehabilitation is possible.

- Learn from the patient what activities promote feelings of comfort and assists the patient in such activities (eg, listening to music, reading); relaxation techniques such as guided imagery and meditation are often helpful.

Maintaining a Patent Airway

- Position patient in semi-Fowler's or Fowler's position after recovery from anesthesia.
- Observe for restlessness, labored breathing, apprehension, and increased pulse rate, which may indicate possible respiratory or circulatory problems; assess lung sounds and report changes that may indicate impending complications.
- Use medications that depress respirations with caution; however, adequate use of analgesic medications is essential, as postoperative pain can result in shallow breathing and ineffective cough.
- Encourage patient to turn, cough, and deep breathe; suction if necessary; encourage early ambulation.
- Care for the laryngectomy tube the same way as a tracheostomy tube; humidification and suctioning are essential if there is no inner cannula.
- Keep stoma clean by cleansing daily as prescribed, and wipe opening clean as needed after coughing.

Promoting Alternative Communication Methods

- Work with the patient, speech therapist, and family to encourage use of alternative communication methods; these methods must be used consistently postoperatively.
- Provide the patient with a call or hand bell; a Magic Slate may be used for communication.
- Use nonwriting arm for IV infusions.
- If patient cannot write, a picture–word–phrase board or hand signals can be used.
- Provide adequate time for patient to communicate his or her needs.

Promoting Adequate Nutrition and Hydration

- Maintain patient *non per os* (nothing by mouth [NPO]) for several days, and provide alternative sources of nutrition as ordered: IV fluids, enteral feedings, and PN; explain nutritional plan to patient and family.

- Start oral feedings with thick fluids for easy swallowing; instruct patient to avoid sweet foods, which increase salivation and suppress appetite; introduce solid foods as tolerated.
- Instruct patient to rinse mouth with warm water or mouthwash and brush teeth frequently.
- Observe patient for difficulty swallowing (particularly with eating); report occurrence to physician.
- Monitor weight and laboratory data to ensure nutritional and fluid intake are adequate; monitor skin turgor and vital signs for signs of decreased fluid volume.

Improving Self-Concept

- Encourage patient to express feelings about changes from surgery (fear, anger, depression, and isolation); encourage use of previous effective coping strategies; be a good listener and support the family.
- Refer to a support group, such as the International Association of Laryngectomees (IAL), WebWhispers, and I Can Cope.
- Use a positive approach; promote participation in self-care activities as soon as possible.

Monitoring and Managing Potential Postoperative Complications

Complications after laryngectomy include respiratory distress and hypoxia, hemorrhage, infection, wound breakdown, aspiration, and tracheostomal stenosis.

- Monitor for signs and symptoms of respiratory distress and hypoxia, particularly restlessness, irritation, agitation, confusion, tachypnea, use of accessory muscles, and decreased oxygen saturation on pulse oximetry (SpO_2).
- Monitor vital signs for changes: increase in pulse, decrease in blood pressure, or rapid, deep respirations; monitor WBC count.
- Cold, clammy, pale skin may indicate active bleeding; notify surgeon promptly of any active bleeding.
- Observe for early signs and symptoms of infection: increase in temperature or pulse, change in type of wound drainage, increased areas of redness or tenderness at

surgical site, purulent drainage, odor, and increase in wound drainage.

- Observe stoma area for wound breakdown, hematoma, and bleeding, and report significant changes to the surgeon.
- Monitor patient carefully, particularly for carotid hemorrhage.
- Monitor for possible reflux and aspiration; keep suction equipment available.
- Perform tracheostomy care routinely.

NURSING ALERT

Postoperatively, be alert for the possible serious complications of rupture of the carotid artery. Should this occur, apply direct pressure over the artery, summon assistance, and provide psychological support until the vessel can be ligated.

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE

- Provide discharge instructions as soon as patient is able to participate; assess readiness to learn.
- Assess knowledge about self-care management; reassure patient and family that strategies can be mastered.
- Give specific information about tracheostomy and stomal care, wound care, and oral hygiene, including suctioning and emergency measures; instruct the patient about the need for adequate dietary intake, safe hygiene, and recreational activities.
- Instruct patient to provide adequate humidification of the environment, minimize air-conditioning, and drink fluids.
- Teach patient to take precautions when showering to prevent water from getting into the stoma.
- Discourage swimming, because the patient with a laryngectomy can drown.
- Recommend that patient avoid getting hairspray, loose hair, and powder into stoma.
- Teach the patient and caregiver the signs and symptoms of infection; identify indications that require contacting the physician after discharge.

- Stress that activity should be undertaken in moderation; when tired, the patient has more difficulty speaking with new voice.
- Instruct patient to wear or carry medical identification, such as a bracelet or card, to alert medical personnel to the special requirements for resuscitation should this need arise.

CONTINUING CARE

- Refer to home care agency for patient and family assistance, follow-up assessment, and teaching.
- Encourage patient to visit physician regularly for physical examinations and advice.
- Remind the patient to participate in health promotion activities and health screening.

Evaluation

Expected Patient Outcomes

- Demonstrates an adequate level of knowledge, verbalizing an understanding of the surgical procedure, and performing self-care adequately
- Demonstrates less anxiety and depression
- Maintains a clear airway and handles own secretions
- Demonstrates practical, safe, and correct technique for cleaning and changing the tracheostomy or laryngectomy tube
- Acquires effective communication techniques
- Maintains adequate nutrition and fluid intake
- Exhibits improved body image, self-esteem, and self-concept
- Exhibits no complications
- Adheres to rehabilitation and home care program

For more information, see Chapter 22 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cancer of the Liver

Few cancers originate in the liver. Primary liver tumors usually are associated with chronic liver disease, hepatitis B and C, and cirrhosis. Hepatocellular carcinoma (HCC), the most

common type of primary liver tumor, usually cannot be resected because of rapid growth and metastasis elsewhere. Other types include cholangiocellular carcinoma and combined hepatocellular and cholangiocellular carcinoma. If found early, resection may be possible; however, early detection is unlikely.

Cirrhosis, hepatitis B and C, and exposure to certain chemical toxins have been implicated in the etiology of HCC. Cigarette smoking, especially when combined with alcohol use, has also been identified as a risk factor. Other substances that have been implicated include aflatoxins and other similar toxic molds. Metastases from other primary sites, particularly the digestive system, breast and lung, are found in the liver 2.5 times more frequently than tumors due to primary liver cancers.

Clinical Manifestations

- Early manifestations include pain (dull ache in upper right quadrant, epigastrium, or back), weight loss, loss of strength, anorexia, and anemia.
- Liver enlargement and irregular surface may be noted on palpation.
- Jaundice is present only if larger bile ducts are occluded.
- Ascites develops if such nodules obstruct the portal veins or if tumor tissue is seeded in the peritoneal cavity.

Assessment and Diagnostic Findings

Diagnosis is made on the basis of clinical signs and symptoms, history and physical examination, and results of laboratory and x-ray studies, PET scans, liver scans, CT scans, ultrasound, MRI, arteriography, laparoscopy, or biopsy. Leukocytosis (increased WBC counts), erythrocytosis (increased red blood cell counts), hypercalcemia, hypoglycemia, and hypocholesterolemia may also be seen on laboratory assessment. Elevated levels of serum alpha-fetoprotein (AFP) may be found.

Medical Management

Radiation Therapy

- IV or intra-arterial injection of antibodies tagged with radioactive isotopes that specifically attack tumor-associated antigens

- Percutaneous placement of a high-intensity source for interstitial radiation therapy

Chemotherapy

- Systemic chemotherapy; embolization of tumor vessels with chemotherapy
- An implantable pump to deliver high-concentration chemotherapy to the liver through the hepatic artery

Percutaneous Biliary Drainage

- Percutaneous biliary drainage is used to bypass biliary ducts obstructed by the liver, pancreatic, or bile ducts in patients with inoperable tumors or those who are poor surgical risks.
- Complications include sepsis, leakage of bile, hemorrhage, and reobstruction of the biliary system.
- Observe patient for fever and chills, bile drainage around the catheter, changes in vital signs, and evidence of biliary obstruction, including increased pain or pressure, pruritus, and recurrence of jaundice.

Other Nonsurgical Treatment Modalities

- Hyperthermia: Heated by laser or radiofrequency energy is directed to tumors to cause necrosis of the tumors while sparing normal tissue.
- Radiofrequency thermal ablation (tumor cell death from coagulation necrosis).
- Immunotherapy: Lymphocytes with antitumor reactivity are administered.
- Embolization (ischemia and necrosis of the tumor occur).
- For multiple small lesions, ultrasound-guided injection of alcohol promotes dehydration of tumor cells and tumor necrosis.

Surgical Management

Hepatic resection can be performed when the primary hepatic tumor is localized or when the primary site can be completely excised and the metastasis is limited. Capitalizing on the regenerative capacity of the liver cells, surgeons have successfully removed 90% of the liver. The presence of cirrhosis limits the ability of the liver to regenerate. In preparation for surgery, the patient’s nutritional, fluid, and general physical status are assessed, and efforts are undertaken to ensure the best physical condition possible.

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- Removal of a lobe of the liver is the most common surgical procedure for excising a liver tumor.
- In patients who are not candidates for resection or transplantation, ablation of HCC may be accomplished by chemicals such as ethanol or by physical means such as radiofrequency ablation or microwave coagulation.
- Removing the liver and replacing it with a healthy donor organ is another way to treat liver cancer.

Nursing Management: Postoperative

See "Nursing Management" under "Cancer" for additional information.

- Assess for problems related to cardiopulmonary involvement, vascular complications, and respiratory and liver dysfunction.
- Give careful attention to metabolic abnormalities (glucose, protein, and lipids).
- Provide close monitoring and care for the first 2 or 3 days.
- Instruct patient and family about care of the biliary catheter and the potential complications and side effects of hepatic artery chemotherapy.
- Instruct patient about the importance of follow-up visits to permit frequent checks on the response of patient and tumor to chemotherapy, condition of the implanted pump site, and any toxic effects.
- Encourage patient to resume activities as soon as possible, but caution patient to avoid activities that may damage the pump.
- Provide reassurance and instructions to patient and family to reduce fear that the percutaneous biliary drainage catheter will fall out.
- Provide verbal and written instructions as well as demonstration of biliary catheter care to patient and family; instruct in techniques to keep catheter site clean and dry, to assess the catheter and its insertion site, and to irrigate the catheter to prevent debris and promote patency.
- Refer patient for home care.
- Collaborate with the health care team, patient, and family to identify and implement pain management strategies and

approaches to management of other problems: weakness, pruritus, inadequate dietary intake, jaundice, and symptoms associated with metastasis.

- Assist patient and family in making decisions about hospice care, and initiate referrals. Encourage patient to discuss end-of-life care.

For more information, see Chapter 39 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L, & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cancer of the Lung (Bronchogenic Carcinoma)

Lung cancers arise from a single transformed epithelial cell in the tracheobronchial airways. A carcinogen (cigarette smoke, radon gas, other occupational and environmental agents) damages the cell, causing abnormal growth and development into a malignant tumor. Most lung cancers are classified into one of two major categories: small cell lung cancer (15% to 20% of tumors) and non–small cell lung cancer (NSCLC; approximately 80% of tumors). NSCLC cell types include squamous cell carcinoma (20% to 30%), which is usually more centrally located; large cell carcinoma (15%), which is fast growing and tends to arise peripherally; and adenocarcinoma (40%), which presents as peripheral masses and often metastasizes and includes bronchoalveolar carcinoma. Most small cell cancers arise in the major bronchi and spread by infiltration along the bronchial wall.

Risk factors include tobacco smoke, second-hand (passive) smoke, environmental and occupational exposures, gender, genetics, and dietary deficits. Other factors that have been associated with lung cancer include genetic predisposition and underlying respiratory diseases, such as chronic obstructive pulmonary disease (COPD) and tuberculosis (TB).

Clinical Manifestations

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- Lung cancer often develops insidiously and is asymptomatic until late in its course.
- Signs and symptoms depend on location, tumor size, degree of obstruction, and existence of metastases to regional or distant sites.
- Most common symptom is cough or change in a chronic cough.
- Dyspnea may occur early in the disease.
- Hemoptysis or blood-tinged sputum may be expectorated.
- Chest pain or shoulder pain may indicate chest wall or pleural involvement. Pain is a late symptom and may be related to bone metastasis.
- Recurring fever may be an early symptom.
- Chest pain, tightness, hoarseness, dysphagia, head and neck edema, and symptoms of pleural or pericardial infusion exist if the tumor spreads to adjacent structures and lymph nodes.
- Common sites of metastases are lymph nodes, bone, brain, contralateral lung, adrenal glands, and liver.
- Weakness, anorexia, and weight loss may appear.

NURSING ALERT

A cough that changes in character should arouse suspicion of lung cancer.

Assessment and Diagnostic Methods

- Chest x-ray, CT scans, bone scans, abdominal scans, PET scans, liver ultrasound, and MRI.
- Sputum examinations, fiberoptic bronchoscopy, transthoracic fine-needle aspiration, endoscopy with esophageal ultrasound, mediastinoscopy or mediastinotomy, and biopsy.
- Pulmonary function tests, ABG analysis scans, and exercise testing.
- Staging of the tumor refers to the size of the tumor, its location, whether lymph nodes are involved, and whether the cancer has spread. (See “Tumor Staging and Grading” under “Cancer” for additional information.)

Medical Management

See "Medical Management" under "Cancer" for additional information.

- The objective of management is to provide a cure if possible. Treatment depends on cell type, stage of the disease, and physiologic status.
- Treatment may involve surgery (preferred), radiation therapy, or chemotherapy—or a combination of these. Newer and more specific therapies to modulate the immune system (gene therapy, therapy with defined tumor antigens) are under study and show promise.

Nursing Management

See "Nursing Management" under "Cancer" for additional information.

Managing Symptoms

Instruct patient and family about the side effects of specific treatments and strategies to manage them.

Relieving Breathing Problems

- Maintain airway patency; remove secretions through deep breathing exercises, chest physiotherapy, directed cough, suctioning, and in some instances bronchoscopy.
- Administer bronchodilator medications; supplemental oxygen will probably be necessary.
- Encourage patient to assume positions that promote lung expansion and to perform breathing exercises.
- Teach energy conservation and airway clearance techniques.
- Refer for pulmonary rehabilitation as indicated.

Reducing Fatigue

- Assess level of fatigue; identify potentially treatable causes.
- Educate patient in energy conservation techniques and guided exercise as appropriate.
- Refer to physical or occupational therapist as indicated.

Providing Psychological Support

- Help patient and family deal with poor prognosis and progression of the disease (when indicated).
- Assist patient and family with informed decision making regarding treatment options.

- Suggest methods to maintain the patient's quality of life during the course of this disease.
- Support patient and family in end-of-life decisions and treatment options.
- Help identify potential resources for the patient and family.

For more information, see Chapter 23 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cancer of the Oral Cavity and Pharynx

Cancer of the oral cavity and pharynx can occur in any part of the mouth (lips, lateral tongue, floor of mouth most common) or throat and is highly curable if discovered early. Risk factors for cancer of the oral cavity and pharynx include cigarette, cigar, and pipe smoking; use of smokeless tobacco; and excessive use of alcohol. Oral cancers are often associated with the combined use of alcohol and tobacco. Other factors include gender (male), age (older than 50 years), and African American descent. Malignancies of the oral cavity are usually squamous cell cancers.

Clinical Manifestations

- Few or no symptoms; most commonly a painless sore or mass that will not heal.
- Typical lesion is a painful indurated ulcer with raised edges.
- As the cancer progresses, patient may complain of tenderness; difficulty in chewing, swallowing, or speaking; coughing of blood-tinged sputum; or enlarged cervical lymph nodes.

Assessment and Diagnostic Methods

Oral examination, assessment of cervical lymph nodes, and biopsies of suspicious lesions (not healed within 2 weeks)

Medical Management

Management varies with the nature of the lesion, preference of the physician, and patient choice. Resectional surgery,

radiation therapy, chemotherapy, or a combination may be effective.

- Lip cancer: Small lesions are excised liberally; larger lesions may be treated by radiation therapy.
- Tongue cancer: Treated aggressively, recurrence rate is high. Radiation and surgery (total resection or hemiglossectomy) are performed.
- Radical neck dissection for metastases of oral cancer to lymphatic channel in the neck region with reconstructive surgery.

Nursing Management

Preoperative

- Assess the patient's nutritional status preoperatively; a dietary consultation may be necessary.
- Implement enteral (through the GI tract) or parenteral (IV) feedings as needed to maintain adequate nutrition.
- If a radial graft is to be performed, perform an Allen test on the donor arm must to ensure that the ulnar artery is patent and can provide blood flow to the hand after removal of the radial artery.
- Assess the patient's ability to communicate in writing as verbal communication may be impaired by radical surgery for oral cancer (provide a pen and paper after surgery to patients who can use them to communicate).
- Obtain a communication board with commonly used words or pictures (give after surgery to patients who cannot write so that they may point to needed items).
- Consult a speech therapist.

Postoperative

- Assess for a patent airway.
- Perform suctioning if the patient is unable to manage oral secretions; if grafting was part of the surgery, suctioning must be performed with care to prevent damage to the graft.
- Assess the graft for viability; assess color (white may indicate arterial occlusion, and blue mottling may indicate venous congestion), although it can be difficult to assess the graft by looking into the mouth.

- A Doppler ultrasound device may be used to locate the radial pulse at the graft site and to assess graft perfusion.

For more information, see Chapter 35 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cancer of the Ovary

Ovarian cancer is the leading cause of gynecological cancer deaths in the United States, with peak incidence in the early 1980s. Despite careful physical examination, ovarian tumors are often difficult to detect because they are usually deep in the pelvis. No definitive causative factors have been determined, but pregnancy and oral contraceptives appear to provide a protective effect. Most (90%) ovarian cancers are epithelial in origin; other tumors include germ cell tumors and stromal tumors. Risk factors include a history of breast cancer, a family history of ovarian cancer, older age, low parity, and obesity.

Clinical Manifestations

- Increased abdominal girth, pelvic pressure, bloating, back pain, constipation, abdominal pain, urinary urgency, indigestion, flatulence, increased waist size, leg pain, and pelvic pain
- Vague GI symptoms or a palpable ovary in a postmenopausal woman

Assessment and Diagnostic Methods

- No screening mechanism exists; tumor markers are being explored. Biannual pelvic examinations are recommended for at-risk women.
- Any enlarged ovary must be investigated; pelvic examination does not detect early ovarian cancer, and pelvic imaging techniques are not always definitive.
- Transvaginal ultrasound and CA125 antigen testing are helpful for high-risk women.

Medical Management

- Surgical removal is the treatment of choice.
- Preoperative workup can include a barium enema or colonoscopy, upper GI series, MRI, ultrasound, chest x-rays, IV urography, and CT scan.
- Staging of the tumor is performed to direct treatment.
- Likely treatment involves a total abdominal hysterectomy with removal of the fallopian tubes and ovaries and possibly, the omentum (bilateral salpingo-oophorectomy and omentectomy); tumor debulking; para-aortic and pelvic lymph node sampling; diaphragmatic biopsies; random peritoneal biopsies; and cytologic washings.
- Chemotherapy, including liposomal and intraperitoneal delivery, is the most common form of treatment for advanced disease (eg, cisplatin, paclitaxel [Taxol]).
- Gene therapy is a future possibility.

Nursing Management

- Perform nursing measures, including treatments related to surgery, radiation, chemotherapy, and palliation. See "Nursing Management" under "Cancer" and under "Preoperative and Postoperative Nursing Management" in Chapter P.
- Monitor for complications of therapy and abdominal surgery; report manifestations of complications to physician.
- Determine patient's emotional needs, including desire for childbearing. Provide emotional support by giving comfort, showing attentiveness and caring. Allow patient to express feelings about condition and risk for death.

For more information, see Chapter 47 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cancer of the Pancreas

Cancer may develop in the head, body, or tail of the pancreas. Symptoms vary depending on the location of the lesion and whether functioning insulin-secreting pancreatic islet cells are

involved. It is very rare before the age of 45 years, and most patients present in or beyond the sixth decade of life. Risk factors include cigarette smoking, exposure to industrial chemicals or toxins in the environment, and a diet high in fat, meat, or both. Pancreatic cancer is also associated with diabetes mellitus, chronic pancreatitis, and hereditary pancreatitis. Tumors that originate in the head of the pancreas are the most common and obstruct the common bile duct; functioning islet cell tumors are responsible for the syndrome of hyperinsulinism, particularly in islet cell tumors. The pancreas can also be the site of metastasis from other tumors. Pancreatic carcinoma has a 5% survival rate at 5 years, regardless of the stage of disease at diagnosis.

Clinical Manifestations

- Pain, jaundice, or both are present in more than 80% of patients and, along with weight loss, are considered classic signs of pancreatic carcinoma but often do not appear until the disease is far advanced.
- Rapid, profound, and progressive weight loss.
- Vague upper- or midabdominal pain or discomfort unrelated to any GI function; radiates as a boring pain in the midback and is more severe at night and when lying in the supine position; pain is often progressive and severe. Ascites is common.
- Symptoms of insulin deficiency (diabetes: glucosuria, hyperglycemia, and abnormal glucose tolerance) may be an early sign of carcinoma.
- Meals often aggravate epigastric pain.
- Malabsorption of nutrients and fat-soluble vitamins, anorexia and malaise, and clay-colored stools and dark urine are common with tumors in the head of the pancreas.
- Gastrointestinal x-rays may show deformities in adjacent viscera related to pancreatic mass.

Assessment and Diagnostic Methods

- Spiral (helical) CT is more than 85% to 90% accurate in the diagnosis and staging of pancreatic cancer and is currently the most useful preoperative imaging technique.
- MRI, endoscopic retrograde cholangiopancreatography (ERCP), EUS, GI x-rays, percutaneous fine-needle biopsy,

percutaneous transhepatic cholangiography (PTC), angiography, laparoscopy, or intraoperative ultrasonography.
- Glucose tolerance test to diagnose a pancreatic islet tumor.
- Tumor markers are useful indicators of disease progression.

Medical Management

- Surgical procedure is extensive to remove resectable localized tumors (eg, pancreatectomy, Whipple resection).
- Radiation and chemotherapy may be used; intraoperative radiation therapy (IORT) or interstitial implantation of radioactive sources may be used for pain relief.
- Diet high in protein with pancreatic enzymes, adequate hydration, vitamin K, and treatment of anemia with blood components and total PN may be instituted before surgery when indicated.
- Treatment is often limited to palliative measures owing to widespread metastases, especially to liver, lungs, and bones.
- A biliary stent may be used to relieve jaundice.

Nursing Management

See “Preoperative and Postoperative Nursing Management” in Chapter P for additional information.

- Provide pain management and attention to nutrition. Be alert for hypoglycemia in patient with pancreatic islet tumor.
- Assist patient to explore all aspects and effects of radiation therapy, chemotherapy, or surgery on an individual basis.
- Provide skin care and measures to relieve pain and discomfort associated with jaundice, anorexia, and profound weight loss.
- Monitor patient postoperatively: vital signs, ABGs and pressures, pulse oximetry, laboratory values, and urine output.
- Provide emotional support to patient and family before, during, and after treatment.
- Discuss patient-controlled analgesia (PCA) for severe, escalating pain.
- If chemotherapy is elected, focus teaching on prevention of side effects and complications of agents used.
- If surgery was performed, teach patient about managing the drainage system and monitoring for complications.

- Teach patient and family strategies to prevent skin breakdown and relieve pain, pruritus, and anorexia, including instruction about PCA, TPN, and diet modification with pancreatic enzymes if indicated because of malabsorption and hyperglycemia. Monitor serum glucose levels if patient had a pancreatic islet tumor.
- Discuss palliative care with patient and family to relieve discomfort, assist with care, and comply with end-of-life decisions.
- Instruct family about changes in patient's status that should be reported to the physician.
- Refer patient for home care for help dealing with problems, discomforts, and psychological effects. Discharge to a long-term care setting with communication to staff about prior teaching.

For more information, see Chapter 40 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L, & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cancer of the Prostate

Cancer of the prostate is the most common cancer in men (other than nonmelanoma skin cancer) and is the second most common cause of cancer deaths in American men. African American men are twice as likely than men of any other racial or ethnic group to die of prostate cancer. Risk factors include increasing age, a family history, and possibly a high-fat diet. Endogenous hormones, such as androgens and estrogens, also may be associated with the development of prostate cancer.

Clinical Manifestations

- Usually asymptomatic in early stage
- Nodule felt within the substance of the gland or extensive hardening in the posterior lobe

Advanced Stage

- Lesion is stony hard and fixed.
- Obstructive symptoms occur late in the disease: difficulty and frequency of urination, urinary retention, decreased size and force of urinary stream.

- Blood in urine or semen; painful ejaculation.
- Cancer can spread to lymph nodes and bone.
- Symptoms of metastases include backache, hip pain, perineal and rectal discomfort, anemia, weight loss, weakness, nausea, oliguria, and spontaneous pathologic fractures; hematuria may result from urethral or bladder invasion.
- Sexual dysfunction.

Assessment and Diagnostic Methods

- Digital rectal examination (DRE; preferably by the same examiner).
- The diagnosis is confirmed by a histologic examination of tissue removed surgically by transurethral resection of the prostate (TURP), open prostatectomy, ultrasound-guided transrectal needle biopsy, or fine-needle aspiration.
- Prostate-specific antigen (PSA) level; transrectal ultrasound; bone scans, skeletal x-rays, and MRI; pelvic CT scans; or monoclonal antibody-based imaging may also be used.

Medical Management

Treatment is based on the patient's life expectancy, symptoms, risk of recurrence after definitive treatment, size of the tumor, Gleason score, PSA level, likelihood of complications, and patient preference. Management can range from nonsurgical methods that involve "watchful waiting" to surgery (eg, prostatectomy).

Radical Prostatectomy

- Removal of the prostate, seminal vesicles, tips of the vas deferens, and often the surrounding fat, nerves, and blood vessels through suprapubic approach (greater blood loss), perineal approach (easily contaminated, incontinence, impotence, and rectal injury common), or retropubic approach (infection can readily start).
- This procedure is used with patients whose tumor is confined to the prostate.
- Sexual impotency and various degrees of urinary incontinence commonly follow radical prostatectomy.

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Radiation Therapy

- Teletherapy (external beam radiation therapy [EBRT]): treatment option for patients with low risk prostate cancer
- Brachytherapy (internal implants): commonly used monotherapy treatment option for early, clinically organ-confined prostate cancer
- Side effects: inflammation of the rectum, bowel, and bladder (proctitis, enteritis, and cystitis); acute urinary dysfunction; pain with urination and ejaculation; rectal urgency, diarrhea, and tenesmus; rectal proctitis, bleeding, and rectal fistula; painless hematuria; chronic interstitial cystitis; urethral stricture erectile dysfunction; and rarely, secondary cancers of the rectum and bladder

Hormone Therapy

- Androgen deprivation therapy (ADT): accomplished either by surgical castration (bilateral orchiectomy, removal of the testes) or by medical castration with the administration of medications, such as luteinizing hormone–releasing hormone (LHRH) agonists.
- Hypogonadism is responsible for the adverse effects of ADT, which include vasomotor flushing, loss of libido, decreased bone density (resulting in osteoporosis and fractures), anemia, fatigue, increased fat mass, lipid alterations, decreased muscle mass, gynecomastia (increased breast tissue), and mastodynia (breast/nipple tenderness).

Other Therapies

- Chemotherapy
- Cryosurgery for those who cannot physically tolerate surgery or for recurrence
- Repeated TURPs to keep urethra patent; suprapubic or transurethral catheter drainage when repeated TUR is impractical
- Opioid or nonopioid medications to control pain with metastasis to bone
- Blood transfusions to maintain adequate hemoglobin levels
- Various forms of CAM

NURSING PROCESS

The Patient Undergoing Prostatectomy

Assessment

- Take a complete history, with emphasis on urinary function and the effect of the underlying disorder on patient's lifestyle.
- Note reports of urgency, frequency, nocturia, dysuria, urinary retention, hematuria, or decreased ability to initiate voiding.
- Note family history of cancer, heart disease, or kidney disease, including hypertension.

Diagnosis

Preoperative Nursing Diagnoses

- Anxiety related to inability to void
- Acute pain related to bladder distention
- Deficient knowledge of the problem and treatment protocol

Postoperative Nursing Diagnoses

- Acute pain related to surgical incision, catheter placement, and bladder spasms
- Deficient knowledge about postoperative care

Collaborative Problems/Potential Complications

- Hemorrhage and shock
- Infection
- Deep vein thrombosis
- Catheter obstruction
- Sexual dysfunction

Planning and Goals

The major preoperative goals for the patient may include reduced anxiety and learning about his prostate disorder and the perioperative experience. The major postoperative goals may include maintenance of fluid volume balance, relief of pain and discomfort, ability to perform self-care activities, and absence of complications.

Preoperative Nursing Interventions

Reducing Anxiety

- Clarify the nature of the surgery and expected postoperative outcomes.
- Provide privacy, and establish a trusting and professional relationship.
- Encourage patient to discuss feelings and concerns.

Relieving Discomfort

- While patient is on bed rest, administer analgesic agents; initiate measures to relieve anxiety.
- Monitor voiding patterns; watch for bladder distention.
- Insert indwelling catheter if urinary retention is present or if laboratory test results indicate azotemia.
- Prepare patient for a cystostomy if urinary catheter is not tolerated.

See "Preoperative and Postoperative" under "Nursing Management" for additional information.

Providing Instruction

- Review with the patient the anatomy of the affected structures and their function in relation to the urinary and reproductive systems, using diagrams and other teaching aids if indicated.
- Explain what will take place while the patient is prepared for diagnostic tests and then for surgery (depending on the type of prostatectomy planned).
- Reinforce information given by the surgeon.
- Explain procedures expected to occur during the immediate perioperative period, answer questions the patient or family may have, and provide emotional support.
- Provide information about postoperative pain management.

Preparing Patient for Treatment

- Apply graduated compression stockings.
- Administer enema, if ordered.

Postoperative Nursing Interventions

Maintaining Fluid Balance

- Closely monitor urine output and the amount of fluid used for irrigation; maintain intake/output record.

- Monitor for electrolyte imbalances (eg, hyponatremia), increasing blood pressure, confusion, and respiratory distress.

Relieving Pain

- Distinguish cause and location of pain, including bladder spasms.
- Give analgesic agents for incisional pain and smooth muscle relaxants for bladder spasm.
- Monitor drainage tubing and irrigate drainage system to correct any obstruction.
- Secure catheter to leg or abdomen.
- Monitor dressings, and adjust to ensure they are not too snug or not too saturated or are improperly placed.
- Provide stool softener, prune juice, or an enema, if prescribed.

Monitoring and Managing Complications

- Hemorrhage: Observe catheter drainage; note bright red bleeding with increased viscosity and clots; closely monitor vital signs; administer medications, IV fluids, and blood component therapy as prescribed; maintain accurate record of intake and output; and carefully monitor drainage to ensure adequate urine flow and patency of the drainage system. Provide explanations and reassurance to patient and family.
- Infection: Use aseptic technique with dressing changes; avoid rectal thermometers, tubes, and enemas; provide sitz bath and heat lamps to promote healing after sutures are removed; assess for urinary tract infection (UTI) and epididymitis; administer antibiotics as prescribed.
- Thrombosis: Assess for deep vein thrombosis and pulmonary embolism; apply compression stockings. Assist patient to progress from dangling the day of surgery to ambulating the next morning; encourage patient to walk but not sit for long periods of time. Monitor the patient receiving heparin for excessive bleeding.
- Obstructed catheter: Observe lower abdomen for bladder distention; examine drainage bag, dressings, and surgical incision for bleeding; monitor vital signs to detect hypotension; observe patient for restlessness, diaphoresis, pallor, any drop in blood pressure, and an increasing pulse rate. Provide for patent drainage system; perform gentle irrigation as prescribed to remove blood clots.

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- Urinary incontinence: Encourage patient to take steps to prevent incontinence, improve continence, anticipate leakage, and cope with lack of complete control.
- Sexual dysfunction: Erectile dysfunction, decreased libido, and fatigue may be a concern soon or months after surgery. Medications, surgically placed implants, or negative-pressure devices may help restore function. Reassurance that libido usually returns and fatigue diminishes after recuperation may help. Providing privacy, confidentiality, and time to discuss issues of sexuality is important. Referral to a sex therapist may be indicated.

NURSING ALERT

Urine leakage around the wound may be noted after catheter removal.

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE

- Teach patient and family how to manage drainage system, monitor urinary output, perform wound care, and use strategies to prevent complications.
- Inform patient about signs and symptoms that should be reported to the physician (eg, blood in the urine, decreased urine output, fever, change in wound drainage, or calf tenderness).
- Teach perineal exercises to help regain urinary control.
- As indicated, discuss possible sexual dysfunction (provide a private environment) and refer for counseling.
- Instruct patient not to perform Valsalva maneuver for 6 to 8 weeks because it increases venous pressure and may produce hematuria.
- Urge patient to avoid long car trips and strenuous exercise, which increases tendency to bleed.
- Inform patient that spicy foods, alcohol, and coffee can cause bladder discomfort.
- Encourage fluids to avoid dehydration and clot formation.

CONTINUING CARE
- Refer for home care as indicated.
- Remind patient that return of bladder control may take time.

Evaluation

Expected Preoperative Patient Outcomes
- Demonstrates reduced anxiety
- States pain and discomfort are decreased
- Relates understanding of surgical procedure and postoperative care (perineal muscle exercises and bladder control techniques)

Expected Postoperative Patient Outcomes
- Relates relief of discomfort
- Exhibits fluid and electrolyte balance
- Performs self-care measures
- Remains free of complications
- Reports understanding of changes in sexual function

For more information, see Chapter 49 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cancer of the Skin (Malignant Melanoma)

A malignant melanoma is a malignant neoplasm in which atypical melanocytes (pigment cells) are present in both the epidermis and the dermis (and sometimes the subcutaneous cells). It is the most lethal of all skin cancers. It can occur in one of several forms: superficial spreading melanoma, lentigo-maligna melanoma, nodular melanoma, and acral-lentiginous melanoma.

Most melanomas are derived from cutaneous epidermal melanocytes; some appear in preexisting nevi (moles) in the skin or develop in the uveal tract of the eye. Melanomas occasionally appear simultaneously with cancer of other organs. The incidence and mortality rates of malignant melanoma are

increasing, probably related to increased recreational sun exposure and better early detection. Prognosis is related to the depth of dermal invasion and the thickness of the lesion. Malignant melanoma can spread through both the bloodstream and lymphatic system and can metastasize to the bones, liver, lungs, spleen, CNS, and lymph nodes.

Risk Factors

The cause of malignant melanoma is unknown, but ultraviolet rays are strongly suspected. Risk factors include the following:

- Fair complexion, blue eyes, red or blond hair, and freckles
- Celtic or Scandinavian origin
- Tendency to burn and not tan; significant history of severe sunburn
- Older age; residence in the southwestern United States
- Family or personal history of melanoma, the absence of a gene on chromosome 9P, presence of giant congenital nevi
- Dysplastic nevus syndrome

Clinical Manifestations

Superficial Spreading Melanoma

- Most common form; usually affects middle-aged people, occurs most frequently on trunk and lower extremities
- Circular lesions with irregular outer portions
- Margins of lesion flat or elevated and palpable
- May appear in combination of colors, with hues of tan, brown, and black mixed with gray, bluish black, or white; sometimes a dull, pink-rose color is noted in a small area within the lesion

Lentigo-Maligna Melanoma

- Slowly evolving pigmented lesion
- Occurs on exposed skin areas; hand, head, and neck in elderly people
- First appears as tan, flat lesion, which in time undergoes changes in size and color

Nodular Melanoma

- Spherical, blueberrylike nodule with relatively smooth surface and uniform blue-black color

- May be dome-shaped with a smooth surface or have other shadings of red, gray, or purple
- May appear as irregularly shaped plaques
- May be described as a blood blister that fails to resolve
- Invades directly into adjacent dermis (vertical growth); poor prognosis

Acral-Lentiginous Melanoma

- Occurs in areas not excessively exposed to sunlight and where hair follicles are absent
- Found on the palms of the hands, soles, in nail beds, and mucous membranes in dark-skinned people
- Appears as an irregular pigmented macule that develops nodules
- Becomes invasive early

Assessment and Diagnostic Methods

- Excisional biopsy specimen; incisional biopsy when the suspicious lesion is too large to be removed safely without extensive scarring.
- Chest x-ray, complete blood cell count, liver function tests, and radionuclide or CT scans are ordered for staging once melanoma is confirmed.

Medical Management

The therapeutic approach to malignant melanoma depends on the level of invasion and the depth of the lesion. In addition to surgery, chemotherapy and induced hyperthermia may be used to enhance treatment. Investigators are exploring the potential for the use of lipid-lowering medications and vaccine therapy to prevent melanoma.

Surgical Management

- Surgical excision is the treatment of choice for small superficial lesions.
- Deeper lesions require wide local excision and skin graft.
- A regional lymph node dissection may be performed to rule out metastasis, although newer approaches call for sentinel node biopsy to avoid problems from extensive lymph node removal.
- Debulking the tumor or other palliative procedures may be performed.

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NURSING PROCESS

The Patient with Malignant Melanoma

Assessment

Question patient with a lesion specifically about pruritus, tenderness, and pain, which are not features of a benign nevus. Also investigate changes in preexisting moles or development of new pigmented lesions. Assess people at risk carefully, focusing on the skin:

- Use a magnifying lens to examine for irregularity and changes in the mole.
- Signs that suggest malignant changes include asymmetry (irregular surface), irregular border, variegated color, and large diameter; referred to as the ABCDs of moles.
- Pay attention to common sites of melanoma (eg, back, legs, between toes, face, feet, scalp, fingernails, and backs of hands).

Diagnosis

Nursing Diagnoses

- Acute pain related to surgical incision and grafting
- Anxiety and depression related to possible life-threatening consequences of melanoma and disfigurement
- Deficient knowledge about early signs of melanoma

Collaborative Problems/Potential Complications

- Metastasis
- Infection of surgical site

Planning and Goals

The major goals for the patient may include relief of pain and discomfort, reduced anxiety and depression, increased knowledge of early signs of melanoma, and absence of complications.

Nursing Interventions

Relieving Pain and Discomfort

Promote comfort and anticipate need for and administer appropriate analgesic agents.

Reducing Anxiety

- Give support, and allow patient to express feelings (eg, anxiety, depression).
- Convey understanding of feelings.
- Answer questions and clarify information during the diagnostic workup and staging of the tumor.
- Point out resources, past effective coping mechanisms, and support systems to help the patient cope with diagnosis and treatment.
- Include immediate family in all discussions to clarify information and provide emotional support.

Monitoring and Managing Potential Complications: Metastasis

- Educate patient about treatment and deliver supportive care, provide and clarify information about the therapy and the rationale for its use, identify potential side effects of therapy and ways to manage them, and instruct the patient and family about the expected outcomes of treatment.
- Monitor and document symptoms that may indicate metastasis: lung (eg, difficulty breathing, shortness of breath, increasing cough), bone (eg, pain, decreased mobility and function, pathologic fractures), and liver (eg, change in liver enzyme levels, pain, jaundice).
- Encourage patient to have hope in the therapy while being realistic.
- Provide time for patient to express fears and concerns about the future.
- Offer information about support groups and contact people.
- Arrange for hospice and palliative care services.
- See “Cancer” overview for additional nursing care measures.

Evaluation

Expected Patient Outcomes

- Experiences relief of pain and discomfort
- Achieves reduced anxiety
- Demonstrates understanding of the means for detecting and preventing melanoma
- Experiences absence of complications

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Cancer of the Stomach (Gastric Cancer)

Most gastric cancers are adenocarcinomas; they can occur anywhere in the stomach. The tumor infiltrates the surrounding mucosa, penetrating the wall of the stomach and adjacent organs and structures. It typically occurs in males and people older than 40 years (occasionally in younger people). The incidence of gastric cancer is much greater in Japan. Diet appears to be a significant factor (ie, high in smoked foods and lacking in fruits and vegetables). Other factors related to the incidence of stomach cancer include chronic inflammation of the stomach, *Helicobacter pylori* infection, pernicious anemia, smoking, achlorhydria, gastric ulcers, previous subtotal gastrectomy (more than 20 years ago), and genetics. Prognosis is poor because most patients have metastases (liver, pancreas, and esophagus or duodenum) at the time of diagnosis.

Clinical Manifestations

- Early stages: Symptoms may be absent or may resemble those of patients with benign ulcers (eg, pain relieved with antacids).
- Progressive disease: Symptoms include dyspepsia (indigestion), early satiety, weight loss, abdominal pain just above the umbilicus, loss or decrease in appetite, bloating after meals, nausea and vomiting, and symptoms similar to those of peptic ulcer disease.
- Advanced gastric cancer may be palpable as a mass.

Assessment and Diagnostic Methods

- EGD for biopsy and cytologic washings is the diagnostic study of choice.
- Barium x-ray examination of the upper GI tract, EUS, and CT may be used.

Medical Management

- Removal of gastric carcinoma; curative if tumor can be removed while still localized to the stomach
- Effective palliation (to prevent symptoms such as obstruction) by resection of the tumor; total gastrectomy; radical subtotal gastrectomy; proximal subtotal gastrectomy; esophagogastrectomy

- Chemotherapy for further disease control or for palliation (5-fluorouracil, cisplatin, doxorubicin, etoposide, and mitomycin-C)
- Radiation for palliation
- Tumor marker assessment to determine treatment effectiveness

NURSING PROCESS

The Patient with Stomach Cancer

Assessment

- Elicit history of dietary intake.
- Identify weight loss, including time frame and amount; assess appetite and eating habits; include pain assessment.
- Obtain smoking and alcohol history and family history (eg, any first- or second-degree relatives with gastric or other cancer).
- Assess psychosocial support (marital status, coping skills, emotional and financial resources).
- Perform complete physical examination (palpate and percuss abdomen for tenderness, masses, or ascites).

Diagnosis

Nursing Diagnoses

- Anxiety related to disease and anticipated treatment
- Imbalanced nutrition, less than body requirements, related to early satiety or anorexia
- Pain related to tumor mass
- Anticipatory grieving related to diagnosis of cancer
- Deficient knowledge regarding self-care activities

Planning and Goals

The major goals for the patient may include reduced anxiety, optimal nutrition, relief of pain, and adjustment to the diagnosis and anticipated lifestyle changes.

Nursing Interventions

Reducing Anxiety

- Provide a relaxed, nonthreatening atmosphere (helps patient express fears, concerns, and anger).

- Encourage family in efforts to support the patient, offering assurance and supporting positive coping measures.
- Advise about any procedures and treatments.

Promoting Optimal Nutrition

- Encourage small, frequent feedings of nonirritating foods to decrease gastric irritation.
- Facilitate tissue repair by ensuring food supplements are high in calories and vitamins A and C and iron.
- Administer parenteral vitamin B_{12} indefinitely if a total gastrectomy is performed.
- Monitor rate and frequency of IV therapy.
- Record intake, output, and daily weights.
- Assess signs of dehydration (thirst, dry mucous membranes, poor skin turgor, tachycardia, decreased urine output).
- Review results of daily laboratory studies to note any metabolic abnormalities (sodium, potassium, glucose, BUN).
- Administer antiemetic agents as prescribed.

Relieving Pain

- Administer analgesic agents as prescribed (continuous infusion of an opioid).
- Assess frequency, intensity, and duration of pain to determine effectiveness of analgesic agent.
- Work with the patient to help manage pain by suggesting nonpharmacologic methods for pain relief, such as position changes, imagery, distraction, relaxation exercises (using relaxation audiotapes), back rubs, massage, and periods of rest and relaxation.

Providing Psychosocial Support

- Help patient express fears, concerns, and grief about diagnosis.
- Answer patient's questions honestly.
- Encourage patient to participate in treatment decisions.
- Support patient's disbelief and time needed to accept diagnosis.
- Offer emotional support, and involve family members and significant others whenever possible; reassure that emotional responses are normal and expected.

- Be aware of mood swings and defense mechanisms (denial, rationalization, displacement, regression).
- Provide professional services as necessary (eg, clergy, psychiatric clinical nurse specialists, psychologists, social workers, and psychiatrists).
- Assist with decisions regarding end-of-life care and make referrals as warranted.

Promoting Home- and Community-Based Care

See "Nursing Management" under "Cancer" for additional information.

TEACHING PATIENTS SELF-CARE

- Teach self-care activities specific to treatment regimen.
- Include information about diet and nutrition, treatment regimens, activity and lifestyle changes, pain management, and complications.
- Explain that the possibility of dumping syndrome exists with any enteral feeding, and teach ways to manage it.
- Explain need for daily rest periods and frequent visits to physician after discharge.
- Refer for home care; nurse can supervise any enteral or parenteral feeding and teach patient and family members how to use equipment and formulas as well as how to detect complications.
- Teach patient to record daily intake and output and weight.
- Teach patient how to cope with pain, nausea, vomiting, and bloating.
- Teach patient to recognize and report complications that require medical attention, such as bleeding (overt or covert hematemesis, melena), obstruction, perforation, or any symptoms that become consistently worse.
- Explain chemotherapy or radiation regimen and the care needed during and after treatment.

For more information, see Chapter 37 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cancer of the Testis

Testicular cancer is the most common cancer in men aged 15 to 35 years and the second most common cancer in men aged 35 to 39 years. Testicular cancer is classified as germinal or nongerminal (stomal). Germinal tumors make up approximately 90% of all cancers of the testis and may be further classified as seminomas (slow-growing, remain localized) and fast-growing nonseminomas (choriocarcinomas [rare], embryonal carcinomas, teratomas, and yolk sac tumors). Nongerminal tumors (Leydig cell tumors and Sertoli cell tumors) may develop in the supportive and hormone-producing tissues, or stroma, of the testicles. Risk factors for testicular cancer include undescended testicles (cryptorchidism), family history of testicular cancer, and personal history of testicular cancer. Other risk factors include race and ethnicity, HIV infection, and occupational hazards (eg, exposure to chemicals). Some testicular tumors tend to metastasize early, spreading from the testis to the lymph nodes in the retroperitoneum and to the lungs. Secondary testicular tumors (lymphoma) metastasize from other organs.

Clinical Manifestations

- Symptoms appear gradually, with a mass or lump on the testicle.
- Painless enlargement of the testis occurs; patient may complain of heaviness in the scrotum, inguinal area, or lower abdomen.
- Backache, pain in the abdomen, weight loss, and general weakness may result from metastasis.

Assessment and Diagnostic Methods

- Testicular self-examination (TSE) is an effective early detection method.
- Elevated AFP and beta-human chorionic gonadotropin levels are used as tumor markers.
- Tumor marker levels are used for diagnosis, staging, and monitoring the response to treatment.
- Blood chemistry, including lactate dehydrogenase (LDH).

- Chest x-ray to assess for metastasis in the lungs and a transscrotal testicular ultrasound.
- Inguinal orchiectomy, abdominal/pelvic CT and chest CT (if the abdominal CT or chest x-ray is abnormal), brain MRI, and bone scan.

Medical Management

The goals of management are to eradicate the disease and achieve a cure. Therapy is based on the cell type, the stage of the disease, and risk classification tables (determined as good, intermediate, and poor risks).

- Orchiectomy and retroperitoneal lymph node dissection (RPLND); alternatives to more invasive open RPLND include nerve-sparing and laparoscopic RPLND.
- Sperm banking before surgery is suggested.
- Chemotherapy or radiation therapy.
- Good results may be obtained by combining different types of treatments, including surgery, radiation therapy, and chemotherapy.

Nursing Management

See "Nursing Management" under "Cancer" for additional information.

- Assess the patient's physical and psychological status, and monitor for response to and possible effects of surgery, chemotherapy, and radiation therapy.
- Address issues related to body image and sexuality.
- Encourage patient to maintain a positive attitude during therapy.
- Encourage follow-up evaluation studies and continual TSE (a patient with a history of one tumor of the testis has a greater chance of developing subsequent tumors).
- Encourage healthy behaviors, including smoking cessation, healthy diet, minimization of alcohol intake, and cancer screening activities.

For more information, see Chapter 49 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cancer of the Thyroid

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Cancer of the thyroid is less prevalent than other forms of cancer. The most common type, papillary adenocarcinoma, accounts for more than half of thyroid malignancies; it starts in childhood or early adult life, remains localized, and eventually metastasizes. When papillary adenocarcinoma occurs in an elderly patient, it is more aggressive. Risk factors include female gender and external irradiation of the head, neck, or chest in infancy and childhood. Other types of thyroid cancer include follicular adenocarcinoma, medullary, anaplastic, and thyroid lymphoma.

Clinical Manifestations

Lesions that are single, hard, and fixed on palpation or associated with cervical lymphadenopathy suggest malignancy.

Assessment and Diagnostic Methods

- Needle biopsy or aspiration biopsy of thyroid gland
- Thyroid function tests
- Ultrasound, MRI, CT scan, thyroid scans, radioactive iodine uptake studies, and thyroid suppression tests

Medical Management

- Treatment of choice is surgical removal (total or near-total thyroidectomy).
- Modified or extensive radical neck dissection is done if lymph nodes are involved.
- Radioactive iodine is used to eradicate residual thyroid tissue.
- Thyroid hormone is administered in suppressive doses after surgery to lower the levels of thyroid-stimulating hormone (TSH) to a euthyroid state.
- Lifelong thyroxine is required if remaining thyroid tissue is inadequate to produce sufficient hormone.
- Radiation therapy is administered by several routes.
- Chemotherapy is used only occasionally.

Nursing Management

See "Nursing Management" under "Cancer" for additional information.

- Inform the patient about the purpose of any preoperative tests, and explain what preoperative preparations to expect; teaching includes demonstrating to the patient how to support the neck with the hands after surgery to prevent stress on the incision.
- Provide postoperative care (eg, assess and reinforce surgical dressings, observe for bleeding, monitor pulse and blood pressure for signs of internal bleeding, assess respiratory status, assess intensity of pain and administer analgesics as prescribed).
- Monitor and observe for potential complications such as hemorrhage, hematoma formation, edema of the glottis, and injury to the recurrent laryngeal nerve.
- Teach patient and family about signs and symptoms of possible complications and those that should be reported; suggest strategies for managing postoperative pain at home and for increasing humidification.
- Explains to the patient and family the need for rest, relaxation, and nutrition; patient can resume former activities and responsibilities once recovered from surgery.
- Refer for home care, if indicated.

For more information, see Chapter 42 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cancer of the Vagina

Cancer of the vagina is rare and usually takes years to develop. Primary cancer of the vagina is usually squamous in origin. Malignant melanoma and sarcomas can occur. Risk factors include previous cervical cancer, in utero exposure to diethylstilbestrol (DES), previous vaginal or vulvar cancer, previous radiation therapy, history of HPV infection, or pessary use. Any patient with previous cervical cancer should be examined regularly for vaginal lesions.

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Clinical Manifestations

- Often asymptomatic, but slight bleeding after intercourse may be reported.
- Spontaneous bleeding, vaginal discharge, pain, urinary or rectal symptoms.

Assessment and Diagnostic Methods

- Colposcopy for women exposed to DES in utero
- Pap smear of the vagina

Medical Management

- Treatment of early lesions may include local excision, topical chemotherapy, or laser.
- Surgery for more advanced lesions (depends on the size and the stage of the cancer) followed by reconstructive surgery, if needed, and radiation.

Nursing Management

- Encourage close follow-up by health care providers.
- Provide emotional support.
- Inform women who have had vaginal reconstructive surgery that regular intercourse may be helpful in preventing vaginal stenosis.
- Inform patient that water-soluble lubricants are helpful in reducing dyspareunia.

For more information, see Chapter 47 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cancer of the Vulva

Primary cancer of the vulva is seen mostly in postmenopausal women, but its incidence in younger women is rising. Squamous cell carcinoma accounts for most primary vulvar tumors; less common are Bartholin's gland cancer, vulvar sarcoma, and malignant melanoma. The median age for cancer limited to the vulva is 50 years; the median age for invasive vulvar cancer is 70 years. Possible risk factors include smoking, HPV infection, HIV infection, and immunosuppression.

Clinical Manifestations

- Long-standing pruritus and soreness are the most common symptoms; itching occurs in half of all patients.
- Bleeding, foul-smelling discharge, and pain are signs of advanced disease.
- Early lesions appear as chronic dermatitis; later, a lump that continues to grow and becomes a hard, ulcerated, cauliflowerlike growth.

Assessment and Diagnostic Methods

- Regular pelvic examinations, Pap smears, and vulvar self-examination are helpful in early detection.
- Biopsy.
- Vulvar self-examination.

Medical Management

- Preinvasive (vulvar carcinoma in situ): local excision, laser ablation, chemotherapeutic creams (fluorouracil), or cryosurgery.
- Invasive: wide excision or vulvectomy, external beam radiation, laser therapy, or chemotherapy.
- If a widespread area is involved or the disease is advanced, a radical vulvectomy with bilateral groin dissection may be performed; antibiotic and heparin prophylaxis may be continued postoperatively; graduated compression stockings applied.

Nursing Management

Assessment

- Perform health history; tactfully elicit is the reason why a delay, if any, occurred, in seeking health care.
- Assess health habits and lifestyle; evaluate receptivity to teaching.
- Assess psychosocial factors; give preoperative preparation and psychological support.

Preoperative Nursing Interventions

Relieving Anxiety

- Allow patient time to talk and ask questions.
- Advise patient that the possibility of having sexual relations is good and that pregnancy is possible after a wide excision.
- Reinforce information about the surgery, and address patient's questions and concerns.

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Preparing Skin for Surgery

Skin preparation may include cleansing the lower abdomen, inguinal areas, upper thighs, and vulva with a detergent germicide for several days before the surgical procedure. The patient may be instructed to do this at home.

Postoperative Nursing Interventions

Relieving Pain and Discomfort

- Administer analgesic agents preventively.
- Position patient to relieve tension on incision (pillow under knees or low Fowler's position), and give soothing back rubs.

Improving Skin Integrity

- Provide pressure-reducing mattress.
- Install over-bed trapeze.
- Protect intact skin from drainage and moisture.
- Change dressings as needed to ensure patient comfort, to perform wound care and irrigation (if prescribed), and to permit observation of the surgical site.
- Always protect patient from exposure when visitors arrive or someone else enters the room.

Supporting Positive Sexuality and Sexual Function

- Establish a trusting relationship with patient.
- Encourage patient to share and discuss concerns with sexual partner.
- Consult with surgeon to clarify expected changes.
- Refer patient and partner to a sex counselor, as indicated.

Monitoring and Managing Potential Complications

- Monitor closely for local and systemic signs and symptoms of infection: purulent drainage, redness, increased pain, fever, increased WBC count.
- Assist in obtaining tissue specimens for culture.
- Administer antibiotics as prescribed.
- Avoid crosscontamination; carefully handle catheters, drains, and dressings; hand hygiene is crucial.
- Provide a low-residue diet to prevent straining on defecation and wound contamination.
- Assess for signs and symptoms of deep vein thrombosis and pulmonary embolism; apply elastic compression stockings; encourage ankle exercises.

- Encourage and assist in frequent position changes, avoiding pressure behind the knees.
- Encourage fluid intake to prevent dehydration.
- Monitor closely for signs of hemorrhage and hypovolemic shock.

Promoting Home- and Community-Based Care

Teaching Patients Self-Care

- Encourage patient to share concerns as she recovers.
- Encourage participation in dressing changes and self-care.
- Give complete instructions to family members or others who will provide posthospital care regarding wound care, urinary catheterization, and possible complications.

Continuing Care

- Encourage communication with home care nurse to ensure continuity of care.
- Reinforce teaching with follow-up call between home visits.

For more information, see Chapter 47 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, F. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cardiac Arrest

Cardiac arrest occurs when the heart ceases to produce an effective pulse and circulate blood. It may be caused by a cardiac electrical event (ie, dysrhythmia) such as ventricular fibrillation, progressive profound bradycardia, or when there is no heart rhythm at all (asystole). Cardiac arrest may follow respiratory arrest; it may also occur when electrical activity is present but there is ineffective cardiac contraction or circulating volume, which is called pulseless electrical activity (PEA). PEA can be caused by hypovolemia (eg, with excessive bleeding), hypoxia, hypothermia, hyperkalemia, massive pulmonary embolism, myocardial infarction, and medication overdose (eg, beta-blockers, calcium channel blockers).

Clinical Manifestations

In cardiac arrest, consciousness, pulse, and blood pressure are lost immediately. Ineffective respiratory gasping may occur. The pupils of the eyes begin dilating within 45 seconds. Seizures may or may not occur.

The risk of irreversible brain damage and death increases with every minute from the time that circulation ceases. The interval varies with the age and underlying condition of the patient. During this period, the diagnosis of cardiac arrest must be made and measures must be taken immediately to restore circulation.

Management

- Initiate immediate cardiopulmonary resuscitation (CPR).
- Institute follow-up monitoring once patient is resuscitated.

For more information, see Chapter 30 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cardiomyopathies

Cardiomyopathy is a heart muscle disease associated with cardiac dysfunction. It is classified according to the structural and functional abnormalities of the heart muscle: dilated cardiomyopathy (DCM) (most common), hypertrophic cardiomyopathy (HCM) (rare autosomal dominant condition), restrictive or constrictive cardiomyopathy (RCM), arrhythmogenic right ventricular cardiomyopathy (ARVC), and unclassified cardiomyopathies (different from or have characteristics of more than one of the other types). A patient may have pathology representing more than one of these classifications, such as a patient with HCM developing dilation and symptoms of DCM. *Ischemic cardiomyopathy* is a term frequently used to describe an enlarged heart caused by coronary artery disease (CAD), which is usually accompanied by heart failure.

Pathophysiology

The pathophysiology of all cardiomyopathies is a series of events that culminate in impaired cardiac output. Decreased stroke volume stimulates the sympathetic nervous system and the renin–angiotensin–aldosterone response, resulting in increased systemic vascular resistance and increased sodium and fluid retention, which places an increased workload on the heart. These alterations can lead to heart failure.

Clinical Manifestations

- Presents initially with signs and symptoms of heart failure (shortness of breath on exertion, fatigue).
- May also report paroxysmal nocturnal dyspnea (PND), cough, and orthopnea.
- Other symptoms include fluid retention, peripheral edema, nausea, chest pain, palpitations, dizziness, and syncope with exertion.
- With HCM, cardiac arrest (ie, sudden cardiac death) may be the initial manifestation in young people.
- Systemic venous congestion, jugular vein distention, pitting edema of dependent body parts, hepatic engorgement, tachycardia, and extra heart sounds on physical examination.

Assessment and Diagnostic Methods

- Patient history; rule out other causes of failure
- Echocardiogram, cardiac MRI, electrocardiogram (ECG), chest x-ray, cardiac catheterization, and possibly an endomyocardial biopsy

Medical Management

Medical management is directed toward identifying and managing possible underlying or precipitating causes; correcting the heart failure with medications, a low-sodium diet, and an exercise/rest regimen; and controlling dysrhythmias with antiarrhythmic medications and possibly with an implanted electronic device, such as an implantable cardioverter defibrillator.

- Surgical intervention (eg, myectomy, heart transplantation) is considered when heart failure has progressed and treatment is no longer effective.

C

- In some cases, ventricular assist devices (eg, a left ventricular assist device [LVAD]) are necessary to support the failing heart until a suitable donor becomes available.

NURSING PROCESS

The Patient with a Cardiac Myopathy

Assessment

- Take detailed history of presenting signs and symptoms and possible etiologic factors.
- Careful psychosocial history: Identify family support system and involve family in patient management.
- Physical assessment directed toward signs and symptoms of heart failure. Evaluate vital signs (pulse pressure), weight and any gain/loss, palpation for a shift to the left of the point of maximum impulse, auscultation for a systolic murmur and S_3 and S_4 heart sounds, pulmonary auscultation for crackles, measurement of jugular vein distention, and edema.

Diagnosis

Nursing Diagnoses

- Decreased cardiac output related to structural disorders secondary to cardiomyopathy or dysrhythmia
- Ineffective cardiopulmonary, cerebral, peripheral, and renal tissue perfusion related to decreased peripheral blood flow
- Impaired gas exchange related to pulmonary congestion secondary to myocardial failure
- Activity intolerance related to decreased cardiac output or excessive fluid volume, or both
- Anxiety related to the change in health status and in role functioning
- Powerlessness related to disease process
- Noncompliance with medication and diet therapies

Collaborative Problems/Potential Complications

- Heart failure
- Ventricular and atrial dysrhythmias
- Cardiac conduction defects
- Pulmonary or cerebral embolism
- Valvular dysfunction

Planning and Goals

The major goals for patients include improvement or maintenance of cardiac output, increased activity tolerance, reduction of anxiety, adherence to the self-care program, increased sense of power with decision making, and absence of complications.

Nursing Interventions

Improving Cardiac Output

- Assist patient into a resting position (usually sitting with legs down) during a symptomatic episode.
- Administer oxygen if indicated.
- Administer prescribed medications on time.
- Promote low-sodium meals and adequate fluid intake.
- Keep patient warm, and change positions frequently to stimulate circulation and reduce skin breakdown.

Increasing Activity Tolerance

- Plan nursing care so that activities occur in cycles, alternating rest with activity.
- Ensure that the patient recognizes the symptoms indicating the need for rest and actions to take when the symptoms occur.

Reducing Anxiety

- Spiritual, psychological, and emotional support may be indicated for patients, families, and significant others.
- Provide patient with appropriate information about signs and symptoms.
- Provide an atmosphere in which the patient feels free to verbalize concerns and receive assurance that their concerns are legitimate.
- Assist patient to accomplish a goal, no matter how small, to enhance a sense of well-being.
- Provide time for the patient to discuss concerns if facing death or awaiting transplantation; provide realistic hope.
- Help the patient, family, and significant others with anticipatory grieving.

Decreasing Sense of Powerlessness

- Assist patient in identifying things he or she has lost (eg, foods enjoyed).

- Assist patient in identifying emotional responses to the loss (eg, anger and depression).
- Assist patient in identifying the amount of control that he or she still has (eg, selecting food choices).

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE

- Teaching patients about the medication regimen, symptom monitoring, and symptom management.
- Help patient balance lifestyle and work while accomplishing therapeutic activities.
- Help patient cope with their disease status; helps them to adjust their lifestyles and implement a self-care program at home.

CONTINUING CARE

- Reinforce previous teaching and perform ongoing assessment of the patient's symptoms and progress.
- Assist in review of lifestyle, and suggest strategies to incorporate therapeutic activities to balance lifestyle and work.
- Stress the signs and symptoms that should be reported to the physician; teach the patient's family CPR if necessary.
- Assess the psychosocial needs of the patient and family on an ongoing basis.
- Establish trust with patient, and provide support during end-of-life decision making.
- Refer patient for home care and support if necessary.

Evaluation

Expected Patient Outcomes

- Maintains or improves cardiac function
- Maintains or increases activity tolerance
- Experiences reduction of anxiety
- Decreases sense of powerlessness
- Adheres to self-care program

For more information, see Chapter 29 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cataract

A cataract is a lens opacity or cloudiness. Cataracts can develop in one or both eyes and at any age. Cigarette smoking; long-term use of corticosteroids, especially at high doses; sunlight and ionizing radiation; diabetes; obesity; and eye injuries can increase the risk of cataracts. The three most common types of senile (age-related) cataracts are defined by their location in the lens: nuclear, cortical, and posterior subcapsular. Visual impairment depends on the size, density, and location in the lens. More than one type can be present in one eye.

Clinical Manifestations

- Painless, blurry vision.
- Perception that surroundings are dimmer (as if glasses need cleaning).
- Light scattering; reduced contrast sensitivity, sensitivity to glare, and reduced visual acuity.
- Other effects include myopic shift (return of ability to do close work [eg, reading fine print] without eyeglasses), astigmatism, monocular diplopia (double vision), color shift (the aging lens becomes progressively more absorbent at the blue end of the spectrum), brunescens (color values shift to yellow-brown), and reduced light transmission.

Assessment and Diagnostic Methods

- Degree of visual acuity is directly proportionate to density of the cataract.
- Snellen visual acuity test.
- Ophthalmoscopy.
- Slit-lamp biomicroscopic examination.

Medical Management

No nonsurgical (medications, eyedrops, eyeglasses) treatment cures cataracts or prevents age-related cataracts. Studies have found no benefit from antioxidant supplements, vitamins C and E, beta-carotene, and selenium. Glasses or contact, bifocal, or magnifying lenses may improve vision. Mydriatics can be used short term, but glare is increased.

Surgical Management

In general, if reduced vision from cataract does not interfere with normal activities, surgery may not be needed. In deciding when cataract surgery is to be performed, the patient's functional and visual status should be a primary consideration. Surgical options include phacoemulsification (method of extracapsular cataract surgery) and lens replacement (aphakic eyeglasses, contact lenses, and intraocular lens implants). Cataracts are removed under local anesthesia on an outpatient basis. When both eyes have cataracts, one eye is treated first, with at least several weeks, preferably months, separating the two procedures.

Nursing Management

- Withhold any anticoagulants the patient is receiving, if medically appropriate. In some cases, anticoagulant therapy may continue.
- Administer dilating drops every 10 minutes for four doses at least 1 hour before surgery. Antibiotic, corticosteroid, and anti-inflammatory drops may be administered prophylactically to prevent postoperative infection and inflammation.
- Provide patient verbal and written instructions about how to protect the eye, administer medications, recognize signs of complications, and obtain emergency care.
- Explains that there should be minimal discomfort after surgery, and instruct the patient to take a mild analgesic agent, such as acetaminophen, as needed.
- Antibiotic, anti-inflammatory, and corticosteroid eye drops or ointments are prescribed postoperatively.

For more information, see Chapter 58 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, F. H. (2010). *Brunner and Suddarth's Textbook of Medical-Surgical Nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cerebral Vascular Accident (Ischemic Stroke)

A cerebrovascular accident (CVA), an ischemic stroke or "brain attack," is a sudden loss of brain function resulting from

a disruption of the blood supply to a part of the brain. Stroke is the primary cerebrovascular disorder in the United States. Strokes are usually hemorrhagic (15%) or ischemic/nonhemorrhagic (85%). Ischemic strokes are categorized according to their cause: large artery thrombotic strokes (20%), small penetrating artery thrombotic strokes (25%), cardiogenic embolic strokes (20%), cryptogenic strokes (30%), and other (5%). Cryptogenic strokes have no known cause, and other strokes result from causes such as illicit drug use, coagulopathies, migraine, and spontaneous dissection of the carotid or vertebral arteries. The result is an interruption in the blood supply to the brain, causing temporary or permanent loss of movement, thought, memory, speech, or sensation.

Risk Factors

Nonmodifiable

- Advanced age (older than 55 years)
- Gender (Male)
- Race (African American)

Modifiable

- Hypertension
- Atrial fibrillation
- Hyperlipidemia
- Obesity
- Smoking
- Diabetes
- Asymptomatic carotid stenosis and valvular heart disease (eg, endocarditis, prosthetic heart valves)
- Periodontal disease

Clinical Manifestations

General signs and symptoms include numbness or weakness of face, arm, or leg (especially on one side of body); confusion or change in mental status; trouble speaking or understanding speech; visual disturbances; loss of balance, dizziness, difficulty walking; or sudden severe headache.

Motor Loss

- Hemiplegia, hemiparesis
- Flaccid paralysis and loss of or decrease in the deep tendon reflexes (initial clinical feature) followed by (after 48 hours)

reappearance of deep reflexes and abnormally increased muscle tone (spasticity)

Communication Loss

- Dysarthria (difficulty speaking)
- Dysphasia (impaired speech) or aphasia (loss of speech)
- Apraxia (inability to perform a previously learned action)

Perceptual Disturbances and Sensory Loss

- Visual-perceptual dysfunctions (homonymous hemianopia [loss of half of the visual field])
- Disturbances in visual-spatial relations (perceiving the relation of two or more objects in spatial areas), frequently seen in patients with right hemispheric damage
- Sensory losses: slight impairment of touch or more severe with loss of proprioception; difficulty in interrupting visual, tactile, and auditory stimuli

Impaired Cognitive and Psychological Effects

- Frontal lobe damage: Learning capacity, memory, or other higher cortical intellectual functions may be impaired. Such dysfunction may be reflected in a limited attention span, difficulties in comprehension, forgetfulness, and lack of motivation.
- Depression, other psychological problems: emotional lability, hostility, frustration, resentment, and lack of cooperation.

Assessment and Diagnostic Methods

- History and complete physical and neurologic examination
- Noncontrast CT scan
- 12-lead ECG and carotid ultrasound
- CT angiography or MRI and angiography
- Transcranial Doppler flow studies
- Transthoracic or transesophageal echocardiography
- Xenon-enhanced CT scan
- Single photon emission CT (SPECT) scan

Prevention

- Help patients alter risk factors for stroke; encourage patient to quit smoking, maintain a healthy weight, follow a healthy diet (including modest alcohol consumption), and exercise daily.
- Prepare and support patient through carotid endarterectomy.

- Administer anticoagulant agents as prescribed (eg, low-dose aspirin therapy).

Medical Management

- Recombinant tissue plasminogen activator (t-PA), unless contraindicated; monitor for bleeding
- Anticoagulation therapy
- Management of increased intracranial pressure (ICP): osmotic diuretics, maintain $PaCO_2$ at 30 to 35 mm Hg, position to avoid hypoxia (elevate the head of bed to promote venous drainage and to lower increased ICP)
- Possible hemicraniectomy for increased ICP from brain edema in a very large stroke
- Intubation with an endotracheal tube to establish a patent airway, if necessary
- Continuous hemodynamic monitoring (the goals for blood pressure remain controversial for a patient who has not received thrombolytic therapy; antihypertensive treatment may be withheld unless the systolic blood pressure exceeds 220 mm Hg or the diastolic blood pressure exceeds 120 mm Hg)
- Neurologic assessment to determine if the stroke is evolving and if other acute complications are developing

Management of Complications

- Decreased cerebral blood flow: Pulmonary care, maintenance of a patent airway, and administration of supplemental oxygen as needed.
- Monitor for UTIs, cardiac dysrhythmias, and complications of immobility.

NURSING PROCESS

The Patient Recovering From an Ischemic Stroke

Assessment

During Acute Phase (1 to 3 days)

Weigh patient (used to determine medication dosages), and maintain a neurologic flow sheet to reflect the following nursing assessment parameters:

- Change in level of consciousness or responsiveness, ability to speak, and orientation
- Presence or absence of voluntary or involuntary movements of the extremities: muscle tone, body posture, and head position
- Stiffness or flaccidity of the neck
- Eye opening, comparative size of pupils and pupillary reactions to light, and ocular position
- Color of face and extremities; temperature and moisture of skin
- Quality and rates of pulse and respiration; ABGs, body temperature, and arterial pressure
- Volume of fluids ingested or administered and volume of urine excreted per 24 hours
- Signs of bleeding
- Blood pressure maintained within normal limits

Postacute Phase

Assess the following functions:

- Mental status (memory, attention span, perception, orientation, affect, speech/language).
- Sensation and perception (usually the patient has decreased awareness of pain and temperature).
- Motor control (upper and lower extremity movement); swallowing ability, nutritional and hydration status, skin integrity, activity tolerance, and bowel and bladder function.
- Continue focusing nursing assessment on impairment of function in patient's daily activities.

Diagnosis

Nursing Diagnoses

- Impaired physical mobility related to hemiparesis, loss of balance and coordination, spasticity, and brain injury
- Acute pain related to hemiplegia and disuse
- Deficient self-care (bathing, hygiene, toileting, dressing, grooming, and feeding) related to stroke sequelae
- Disturbed sensory perception (kinesthetic, tactile, or visual) related to altered sensory reception, transmission, and/or integration

- Impaired swallowing
- Impaired urinary elimination related to flaccid bladder, detrusor instability, confusion, or difficulty in communicating
- Disturbed thought processes related to brain damage
- Impaired verbal communication related to brain damage
- Risk for impaired skin integrity related to hemiparesis or hemiplegia, decreased mobility
- Interrupted family processes related to catastrophic illness and caregiving burdens
- Sexual dysfunction related to neurologic deficits or fear of failure

Collaborative Problems/Potential Complications

Decreased cerebral blood flow due to increased ICP; inadequate oxygen delivery to the brain; pneumonia.

Planning and Goals

The major goals for the patient (and family) may include improved mobility, avoidance of shoulder pain, achievement of self-care, relief of sensory and perceptual deprivation, prevention of aspiration, continence of bowel and bladder, improved thought processes, achieving a form of communication, maintaining skin integrity, restored family functioning, improved sexual function, and absence of complications. Goals are affected by knowledge of what the patient was like before the stroke.

Nursing Interventions

Improving Mobility and Preventing Deformities

- Position to prevent contractures; use measures to relieve pressure, assist in maintaining good body alignment, and prevent compressive neuropathies.
- Apply a splint at night to prevent flexion of affected extremity.
- Prevent adduction of the affected shoulder with a pillow placed in the axilla.
- Elevate affected arm to prevent edema and fibrosis.
- Position fingers so that they are barely flexed; place hand in slight supination. If upper extremity spasticity is noted, do not use a hand roll; dorsal wrist splint may be used.

- Change position every 2 hours; place patient in a prone position for 15 to 30 minutes several times a day.

Establishing an Exercise Program

- Provide full range of motion four or five times a day to maintain joint mobility, regain motor control, prevent contractures in the paralyzed extremity, prevent further deterioration of the neuromuscular system, and enhance circulation. If tightness occurs in any area, perform range-of-motion exercises more frequently.
- Exercise is helpful in preventing venous stasis, which may predispose the patient to thrombosis and pulmonary embolus.
- Observe for signs of pulmonary embolus or excessive cardiac workload during exercise period (eg, shortness of breath, chest pain, cyanosis, and increasing pulse rate).
- Supervise and support patient during exercises; plan frequent short periods of exercise, not longer periods; encourage patient to exercise unaffected side at intervals throughout the day.

Preparing for Ambulation

- Start an active rehabilitation program when consciousness returns (and all evidence of bleeding is gone, when indicated).
- Teach patient to maintain balance in a sitting position, then to balance while standing (use a tilt table if needed).
- Begin walking as soon as standing balance is achieved (use parallel bars and have wheelchair available in anticipation of possible dizziness).
- Keep training periods for ambulation short and frequent.

NURSING ALERT

Initiate a full rehabilitation program even for elderly patients.

Preventing Shoulder Pain

- Never lift patient by the flaccid shoulder or pull on the affected arm or shoulder.

- Use proper patient movement and positioning (eg, flaccid arm on a table or pillows when patient is seated, use of sling when ambulating).
- Range-of-motion exercises are beneficial, but avoid overstrenuous arm movements.
- Elevate arm and hand to prevent dependent edema of the hand; administer analgesic agents as indicated.

Enhancing Self-Care

- Encourage personal hygiene activities as soon as the patient can sit up; select suitable self-care activities that can be carried out with one hand.
- Help patient to set realistic goals; add a new task daily.
- As a first step, encourage patient to carry out all self-care activities on the unaffected side.
- Make sure patient does not neglect affected side; provide assistive devices as indicated.
- Improve morale by making sure patient is fully dressed during ambulatory activities.
- Assist with dressing activities (eg, clothing with Velcro closures; put garment on the affected side first); keep environment uncluttered and organized.
- Provide emotional support and encouragement to prevent fatigue and discouragement.

Managing Sensory-Perceptual Difficulties

- Approach patient with a decreased field of vision on the side where visual perception is intact; place all visual stimuli on this side.
- Teach patient to turn and look in the direction of the defective visual field to compensate for the loss; make eye contact with patient, and draw attention to affected side.
- Increase natural or artificial lighting in the room; provide eyeglasses to improve vision.
- Remind patient with hemianopsia of the other side of the body; place extremities so that patient can see them.

Assisting with Nutrition

- Observe patient for paroxysms of coughing, food dribbling out or pooling in one side of the mouth, food retained for long periods in the mouth, or nasal regurgitation when swallowing liquids.

- Consult with speech therapist to evaluate gag reflexes; assist in teaching alternate swallowing techniques, advise patient to take smaller boluses of food, and inform patient of foods that are easier to swallow; provide thicker liquids or pureed diet as indicated.
- Have patient sit upright, preferably on chair, when eating and drinking; advance diet as tolerated.
- Prepare for GI feedings through a tube if indicated; elevate the head of bed during feedings, check tube position before feeding, administer feeding slowly, and ensure that cuff of tracheostomy tube is inflated (if applicable); monitor and report excessive retained or residual feeding.

Attaining Bowel and Bladder Control

- Perform intermittent sterile catheterization during period of loss of sphincter control.
- Analyze voiding pattern and offer urinal or bedpan on patient's voiding schedule.
- Assist the male patient to an upright posture for voiding.
- Provide high-fiber diet and adequate fluid intake (2 to 3 L/day), unless contraindicated.
- Establish a regular time (after breakfast) for toileting.

Improving Thought Processes

- Reinforce structured training program using cognitive-perceptual retraining, visual imagery, reality orientation, and cueing procedures to compensate for losses.
- Support patient: Observe performance and progress, give positive feedback, convey an attitude of confidence and hopefulness; provide other interventions as used for improving cognitive function after a head injury.

Improving Communication

- Reinforce the individually tailored program.
- Jointly establish goals, with patient taking an active part.
- Make the atmosphere conducive to communication, remaining sensitive to patient's reactions and needs and responding to them in an appropriate manner; treat patient as an adult.
- Provide strong emotional support and understanding to allay anxiety; avoid completing patient's sentences.

- Be consistent in schedule, routines, and repetitions. A written schedule, checklists, and audiotapes may help with memory and concentration; a communication board may be used.
- Maintain patient's attention when talking with patient, speak slowly, and give one instruction at a time; allow patient time to process.
- Talk to aphasic patients when providing care activities to provide social contact.

Maintaining Skin Integrity

- Frequently assess skin for signs of breakdown, with emphasis on bony areas and dependent body parts.
- Employ pressure-relieving devices; continue regular turning and positioning (every 2 hours minimally); minimize shear and friction when positioning.
- Keep skin clean and dry, gently massage healthy dry skin, and maintain adequate nutrition.

Improving Family Coping

- Provide counseling and support to family.
- Involve others in patient's care; teach stress management techniques and maintenance of personal health for family coping.
- Give family information about the expected outcome of the stroke, and counsel them to avoid doing things for patient that he or she can do.
- Develop attainable goals for patient at home by involving the total health care team, patient, and family.
- Encourage everyone to approach patient with a supportive and optimistic attitude, focusing on abilities that remain; explain to family that emotional lability usually improves with time.

Helping the Patient Cope with Sexual Dysfunction

- Perform in-depth assessment to determine sexual history before and after the stroke.
- Interventions for patient and partner focus on providing relevant information, education, reassurance, adjustment of medications, counseling regarding coping skills, suggestions for alternative sexual positions, and a means of sexual expression and satisfaction.

Promoting Home- and Community-Based Care

- Teach patient to resume as much self-care as possible; provide assistive devices as indicated.
- Have occupational therapist make a home assessment and recommendations to help patient become more independent.
- Coordinate care provided by numerous health care professionals; help family plan aspects of care.
- Advise family that patient may tire easily, become irritable and upset by small events, and show less interest in daily events.
- Make referral for home speech therapy. Encourage family involvement. Provide family with practical instructions to help patient between speech therapy sessions.
- Discuss patient's depression with physician for possible antidepressant therapy.
- Encourage patient to attend community-based stroke clubs to give a feeling of belonging and fellowship with others.
- Encourage patient to continue with hobbies, recreational and leisure interests, and contact with friends to prevent social isolation.
- Encourage family to support patient and give positive reinforcement.
- Remind spouse and family to attend to personal health and well-being.

Evaluation

Expected Patient Outcomes

- Achieves improved mobility.
- Has no complaints of pain.
- Achieves self-care; performs hygiene care; uses adaptive equipment.
- Demonstrates techniques to compensate for altered sensory reception, such as turning the head to see people or objects.
- Demonstrates safe swallowing.
- Achieves normal bowel and bladder elimination.
- Participates in cognitive improvement program.
- Demonstrates improved communication.
- Maintains intact skin without breakdown.

- Family members demonstrate a positive attitude and coping mechanisms.
- Develops alternative approaches to sexual expression.

For more information, see Chapter 62 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cholelithiasis (and Cholecystitis)

In cholelithiasis, calculi (gallstones) usually form in the gallbladder from solid constituents of bile and vary greatly in size, shape, and composition. There are two major types of gallstones: pigment stones, which contain an excess of unconjugated pigments in the bile, and cholesterol stones (the more common form), which result from bile supersaturated with cholesterol due to increased synthesis of cholesterol and decreased synthesis of bile acids that dissolve cholesterol. Risk factors for pigment stones include cirrhosis, hemolysis, and infections of the biliary tract. These stones cannot be dissolved and must be removed surgically. Risk factors for cholesterol stones include gender (women are two to three times more likely to develop cholesterol stones); use of oral contraceptives, estrogens, and clofibrate; age (usually older than 40 years); multiparous status; and obesity. There is also an increased risk related to diabetes, GI tract disease, T-tube fistula, and ileal resection or bypass.

Cholecystitis, an acute complication of cholelithiasis, is an acute infection of the gallbladder. Most patients with cholecystitis have gallstones (calculous cholecystitis). A gallstone obstructs bile outflow and bile in the gallbladder initiates a chemical reaction, resulting in edema, compromise of the vascular supply, and gangrene. In the absence of gallstones, cholecystitis (acalculous) may occur after surgery, severe trauma, or burns, or with torsion, cystic duct obstruction, multiple blood transfusions, and primary bacterial infections of the gallbladder. Infection causes pain, tenderness, and rigidity of the upper

right abdomen and is associated with nausea and vomiting and the usual signs of inflammation. Purulent fluid inside the gallbladder indicates an empyema of the gallbladder. See "Nursing Process" for additional information.

Clinical Manifestations

- May be silent, producing no pain and only mild GI symptoms
- May be acute or chronic with epigastric distress (fullness, abdominal distention, and vague upper right quadrant pain); may follow a meal rich in fried or fatty foods
- If the cystic duct is obstructed, the gallbladder becomes distended, inflamed, and eventually infected; fever and palpable abdominal mass; biliary colic with excruciating upper right abdominal pain, radiating to back or right shoulder with nausea and vomiting several hours after a heavy meal; restlessness and constant or colicky pain
- Jaundice, accompanied by marked itching, with obstruction of the common bile duct, in a small percentage of patients
- Very dark urine; grayish or clay-colored stool
- Deficiencies of vitamins A, D, E, and K (fat-soluble vitamins)

Assessment and Diagnostic Methods

- Cholecystogram, cholangiogram; celiac axis arteriography
- Laparoscopy
- Ultrasonography; EUS
- Helical CT scans and MRI; ERCP
- Serum alkaline phosphatase; gamma-glutamyl (GGT), gamma-glutamyl transpeptidase (GGTP), LDH
- Cholesterol levels

Gerontologic Considerations

- Surgical intervention for disease of the biliary tract is the most common operation performed in the elderly.
- Biliary disease may be accompanied or preceded by symptoms of septic shock: oliguria, hypotension, mental changes, tachycardia, and tachypnea.
- Cholecystectomy is usually well tolerated and carries a low risk if expert assessment and care are provided before, during, and after surgery.

- Mortality from serious complications is high. Risk of complications and shorter hospital stays make it essential that older patients and their family members receive specific information about signs and symptoms of complications and measures to prevent them.

Medical Management

Major objectives of medical therapy are to reduce the incidence of acute episodes of gallbladder pain and cholecystitis by supportive and dietary management and, if possible, to remove the cause by pharmacotherapy, endoscopic procedures, or surgical intervention.

Nutritional and Supportive Therapy

- Achieve remission with rest, IV fluids, nasogastric suction, analgesia, and antibiotics.
- Diet immediately after an episode is usually low-fat liquids with high protein and carbohydrates followed by solid soft foods as tolerated, avoiding eggs, cream, pork, fried foods, cheese, rich dressings, gas-forming vegetables, and alcohol.

Pharmacologic Therapy

- Ursodeoxycholic acid (UDCA [Urso, Actigall]) and chenodeoxycholic acid (chenodiol or CDCA [Chenix]) are effective in dissolving primarily cholesterol stones.
- Patients with significant, frequent symptoms; cystic duct occlusion; or pigment stones are not candidates for therapy with UDCA.

Nonsurgical Removal of Gallstones

In addition to dissolving gallstones, they can be removed by other instrumentation (eg, catheter and instrument with a basket attached are threaded through the T-tube tract or fistula formed at the time of T-tube insertion, ERCP endoscope), intracorporeal lithotripsy (laser pulse), or extracorporeal shock wave therapy (lithotripsy or extracorporeal shock wave lithotripsy [ESWL]).

Surgical Management

Goal of surgery is to relieve persistent symptoms, to remove the cause of biliary colic, and to treat acute cholecystitis.

- Laparoscopic cholecystectomy: performed through a small incision or puncture made through the abdominal wall in the umbilicus.
- Cholecystectomy: Gallbladder is removed through an abdominal incision (usually right subcostal) after ligation of the cystic duct and artery.
- Minicholecystectomy: Gallbladder is removed through a small incision.
- Choledochostomy: incision into the common duct for stone removal.
- Cholecystostomy (surgical or percutaneous): Gallbladder is opened, and the stone, bile, or purulent drainage is removed.

NURSING PROCESS

THE PATIENT UNDERGOING CHOLECYSTECTOMY

Assessment

- Assess health history: Note history of smoking or prior respiratory problems.
- Assess respiratory status: Note shallow respirations, persistent cough, or ineffective or adventitious breath sounds.
- Evaluate nutritional status (dietary history, general examination, and laboratory study results).

Diagnosis

Nursing Diagnoses

- Acute pain and discomfort related to surgical incision
- Impaired gas exchange related to high abdominal surgical incision
- Impaired skin integrity related to altered biliary drainage after surgical incision
- Imbalanced nutrition, less than body requirements, related to inadequate bile secretion
- Deficient knowledge about self-care activities related to incisional care, dietary modifications (if needed), medications, reportable signs or symptoms (fever, bleeding, vomiting)

Collaborative Problems/Potential Complications

- Bleeding
- Gastrointestinal symptoms

Planning and Goals

Goals include relief of pain, adequate ventilation, intact skin and improved biliary drainage, optimal nutritional intake, absence of complications, and understanding of self-care routines.

Nursing Interventions: Postoperative

- Place patient in low Fowler's position.
- Provide IV fluids and nasogastric suction.
- Provide water and other fluids and soft diet, after bowel sounds return.

Relieving Pain

- Administer analgesic agents as ordered.
- Help patient turn, cough, breathe deeply, and ambulate as indicated.
- Instruct patient to use a pillow or binder to splint incision.

Improving Respiratory Status

- Remind patient to take deep breaths and cough every hour, to expand the lungs fully and prevent atelectasis; promote early ambulation.
- Monitor elderly and obese patients and those with preexisting pulmonary disease most closely for respiratory problems.

Maintaining Skin Integrity and Promoting Biliary Drainage

- Connect tubes to drainage receptacle and secure tubing to avoid kinking (elevate above abdomen).
- Place drainage bag in patient's pocket when ambulating.
- Observe for indications of infection, leakage of bile, and obstruction of bile drainage.
- Observe for jaundice (check the sclera).
- Note and report right upper quadrant abdominal pain, nausea and vomiting, bile drainage around any drainage tube, clay-colored stools, and a change in vital signs.
- Change dressing frequently, using ointment to protect skin from irritation.

- Measure bile collected every 24 hours; document amount, color, and character of drainage.
- Keep careful record of intake and output.

Improving Nutritional Status

Encourages the patient to eat a diet that is low in fats and high in carbohydrates and proteins immediately after surgery. At the time of discharge, advise patient to maintain a nutritious diet and avoid excessive fats; fat restriction is usually lifted in 4 to 6 weeks.

Monitoring and Managing Complications

- Bleeding: Assess periodically for increased tenderness and rigidity of abdomen and report; instruct patient and family to report change in color of stools. Monitor vital signs closely. Inspect incision for bleeding.
- Gastrointestinal symptoms: Assess for loss of appetite, vomiting, pain, distention of abdomen, and temperature elevation; report promptly and instruct patient and family to report symptoms promptly; provide written reinforcement of verbal instructions.

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE

- Teach about medications and their actions.
- Instruct patient to report to physician symptoms of jaundice, dark urine, pale stools, pruritus, or signs of inflammation and infection (eg, pain or fever).
- Instruct patient, verbally and in writing, about care of drainage tubes and to report to physician promptly changes in amount or characteristics of drainage.
- Refer for home care if necessary.
- Emphasize importance of keeping follow-up appointments.

Evaluation

Expected Patient Outcomes

- Reports decrease in pain
- Demonstrates appropriate respiratory function
- Exhibits normal skin integrity around biliary drainage sites

- Obtains relief from dietary intolerance
- Absence of complications

For more information, see Chapter 40 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical Nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Chronic Obstructive Pulmonary Disease (COPD)

COPD is a disease characterized by airflow limitation that is not fully reversible. The airflow limitation is usually progressive and associated with an abnormal inflammatory response of the lung to noxious particles or gases, resulting in narrowing of airways, hypersecretion of mucus, and changes in the pulmonary vasculature. Other diseases such as cystic fibrosis, bronchiectasis, and asthma that were previously classified as types of COPD are now classified as chronic pulmonary disorders, although symptoms may overlap with those of COPD. Cigarette smoking, air pollution, and occupational exposure (coal, cotton, grain) are important risk factors that contribute to COPD development, which may occur over a 20- to 30-year span. Complications of COPD vary but include respiratory insufficiency and failure (major complications) as well as pneumonia, atelectasis, and pneumothorax.

Clinical Manifestations

- COPD is characterized by chronic cough, sputum production, and dyspnea on exertion; often worsen over time.
- Weight loss is common.
- Symptoms are specific to the disease. See "Clinical Manifestations" under "Asthma," "Bronchiectasis," "Bronchitis," and "Emphysema."

Gerontologic Considerations

COPD accentuates many of the physiologic changes associated with aging and is manifested in airway obstruction (in bronchitis) and excessive loss of elastic lung recoil (in emphysema). Additional changes in ventilation–perfusion ratios occur.

Medical Management

- Smoking cessation, if appropriate.
- Bronchodilators, corticosteroids, and other drugs (eg, $alpha_1$-antitrypsin augmentation therapy, antibiotic agents, mucolytic agents, antitussive agents, vasodilators, narcotics). Vaccines may also be effective.
- Oxygen therapy, including nighttime oxygen.
- Varied treatments specific to disease. See "Medical Management" under "Asthma," "Bronchiectasis," "Bronchitis," and "Emphysema."
- Surgery: bullectomy to reduce dyspnea; lung volume reduction to improve lobar elasticity and function; lung transplantation.

Nursing Management

Assessment

Obtain information about current symptoms as well as previous disease manifestations. In addition to the history, nurses review the results of available diagnostic tests.

Achieving Airway Clearance

- Monitor the patient for dyspnea and hypoxemia.
- If bronchodilators or corticosteroids are prescribed, administer the medications properly and be alert for potential side effects.
- Confirm relief of bronchospasm by measuring improvement in expiratory flow rates and volumes (the force of expiration, how long it takes to exhale, and the amount of air exhaled) as well as by assessing the dyspnea and making sure that it has lessened.
- Encourage patient to eliminate or reduce all pulmonary irritants, particularly cigarette smoking.
- Instruct the patient in directed or controlled coughing.
- Chest physiotherapy with postural drainage, intermittent positive-pressure breathing, increased fluid intake, and bland aerosol mists (with normal saline solution or water) may be useful for some patients with COPD.

Improving Breathing Patterns

- Inspiratory muscle training and breathing retraining may help improve breathing patterns.

- Training in diaphragmatic breathing reduces the respiratory rate, increases alveolar ventilation, and sometimes helps expel as much air as possible during expiration.
- Pursed-lip breathing helps slow expiration, prevent collapse of small airways, and control the rate and depth of respiration; it also promotes relaxation.

Improving Activity Tolerance

- Evaluate the patient's activity tolerance and limitations and use teaching strategies to promote independent activities of daily living.
- Determine if patient is a candidate for exercise training to strengthen the muscles of the upper and lower extremities and to improve exercise tolerance and endurance.
- Recommend use of walking aids, if appropriate, to improve activity levels and ambulation.
- Consult with other health care professionals (rehabilitation therapist, occupational therapist, physical therapist) as needed.

Monitoring and Managing Complications

- Assess patient for complications (respiratory insufficiency and failure, respiratory infection, and atelectasis).
- Monitor for cognitive changes, increasing dyspnea, tachypnea, and tachycardia.
- Monitor pulse oximetry values and administer oxygen as prescribed.
- Instruct patient and family about signs and symptoms of infection or other complications and to report changes in physical or cognitive status.
- Encourage patient to be immunized against influenza and *Streptococcus pneumonia*.
- Caution patient to avoid going outdoors if the pollen count is high or if there is significant air pollution and to avoid exposure to high outdoor temperatures with high humidity.
- If a rapid onset of shortness of breath occurs, quickly evaluate the patient for potential pneumothorax by assessing the symmetry of chest movement, differences in breath sounds, and pulse oximetry.

Promoting Home- and Community-Based Care

Teaching Patients Self-Care

- Provide instructions about self-management; assess the knowledge of patients and family members about self-care and the therapeutic regimen.
- Teach patients and family members early signs and symptoms of infection and other complications so that they seek appropriate health care promptly.
- Instruct patient to avoid extremes of heat and cold and air pollutants (eg, fumes, smoke, dust, talcum, lint, and aerosol sprays). High altitudes aggravate hypoxemia.
- Encourage patient to adopt a lifestyle of moderate activity, ideally in a climate with minimal shifts in temperature and humidity; patient should avoid emotional disturbances and stressful situations; patient should be encouraged to stop smoking.
- Review educational information and have patient demonstrate correct metered-dose inhaler (MDI) use before discharge, during follow-up visits, and during home visits.

Continuing Care

- Refer patient for home care if necessary.
- Direct the patient to community resources (eg, pulmonary rehabilitation programs and smoking cessation programs); remind the patient and family about the importance of participating in general health promotion activities and health screening.
- Address quality of life and issues surrounding the end of life in patients with end-stage COPD (eg, symptom management, quality of life, satisfaction with care, information/communication, use of care professionals, use of care facilities, hospital admission, and place of death).

For more information, see Chapter 24 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cirrhosis, Hepatic

Cirrhosis is a chronic disease characterized by replacement of normal liver tissue with diffuse fibrosis that disrupts the structure and function of the liver. Cirrhosis, or scarring of the liver, is divided into three types: alcoholic, most frequently due to chronic alcoholism and the most common type of cirrhosis; postnecrotic, a late result of a previous acute viral hepatitis; and biliary, a result of chronic biliary obstruction and infection (least common type of cirrhosis).

Clinical Manifestations

- Compensated cirrhosis: usually found secondary to routine physical examination; vague symptoms.
- Decompensated cirrhosis: symptoms of decreased proteins, clotting factors, and other substances and manifestations of portal hypertension.
- Liver enlargement early in the course (fatty liver); later in course, liver size decreases from scar tissue.
- Portal obstruction and ascites: Organs become the seat of chronic passive congestion; indigestion and altered bowel function result.
- Infection and peritonitis: Clinical signs may be absent, necessitating paracentesis for diagnosis.
- Gastrointestinal varices: prominent, distended abdominal blood vessels; distended blood vessels throughout the GI tract; varices or hemorrhoids; hemorrhage from the stomach.
- Edema.
- Vitamin deficiency (A, C, and K) and anemia.
- Mental deterioration with impending hepatic encephalopathy and hepatic coma.

Assessment and Diagnostic Methods

- Liver function tests (eg, serum alkaline phosphatase, aspartate aminotransferase [AST] [serum glutamic oxaloacetic transaminase (SGOT)], alanine aminotransferase [ALT] [serum glutamic pyruvic transaminase (SGPT)], GGT, serum cholinesterase, and bilirubin), prothrombin time, ABGs, biopsy
- Ultrasound scanning
- CT scan

- MRI
- Radioisotopic liver scans

Medical Management

Medical management is based on presenting symptoms.

- Treatment includes antacids, vitamins and nutritional supplements, balanced diet; potassium-sparing diuretics (for ascites); avoidance of alcohol.
- Colchicine may increase the length of survival in patients with mild to moderate cirrhosis.

Nursing Management

Promoting Rest

- Position bed for maximal respiratory efficiency; provide oxygen if needed.
- Initiate efforts to prevent respiratory, circulatory, and vascular disturbances.
- Encourage patient to increase activity gradually and plan rest with activity and mild exercise.

Improving Nutritional Status

- Provide a nutritious, high-protein diet supplemented by B-complex vitamins and others, including A, C, and K.
- Encourage patient to eat: Provide small, frequent meals, consider patient preferences, and provide protein supplements, if indicated.
- Provide nutrients by feeding tube or total PN if needed.
- Provide patients who have fatty stools (steatorrhea) with water-soluble forms of fat-soluble vitamins A, D, and E, and give folic acid and iron to prevent anemia.
- Provide a low-protein diet temporarily if patient shows signs of impending or advancing coma; restrict sodium if needed.

Providing Skin Care

- Change patient's position frequently.
- Avoid using irritating soaps and adhesive tape.
- Provide lotion to soothe irritated skin; take measures to prevent patient from scratching the skin.

Reducing Risk of Injury

- Use padded side rails if patient becomes agitated or restless.
- Orient to time, place, and procedures to minimize agitation.

- Instruct patient to ask for assistance to get out of bed.
- Carefully evaluate any injury because of the possibility of internal bleeding.
- Provide safety measures to prevent injury or cuts (electric razor, soft toothbrush).
- Apply pressure to venipuncture sites to minimize bleeding.

Monitoring and Managing Complications

- Monitor for bleeding and hemorrhage.
- Monitor the patient's mental status closely and report changes so that treatment of encephalopathy can be initiated promptly.
- Carefully monitor serum electrolyte levels are and correct if abnormal.
- Administer oxygen if oxygen desaturation occurs; monitor for fever or abdominal pain, which may signal the onset of bacterial peritonitis or other infection.
- Assess cardiovascular and respiratory status; administer diuretics, implement fluid restrictions, and enhance patient positioning, if needed.
- Monitor intake and output, daily weight changes, changes in abdominal girth, and edema formation.
- Monitor for nocturia and, later, for oliguria, because these states indicate increasing severity of liver dysfunction.

See "Nursing Management" under "Hepatic Encephalopathy" for additional information.

Promoting Home- and Community-Based Care

Prepare for discharge by providing dietary instruction, including exclusion of alcohol.

- Refer to Alcoholics Anonymous, psychiatric care, counseling, or spiritual advisor if indicated.
- Continue sodium restriction; stress avoidance of raw shellfish.
- Provide written instructions, teaching, support, and reinforcement to patient and family.
- Encourage rest and probably a change in lifestyle (adequate, well-balanced diet and elimination of alcohol).
- Instruct family about symptoms of impending encephalopathy and possibility of bleeding tendencies and infection.

- Offer support and encouragement to the patient and provide positive feedback when the patient experiences successes.
- Refer patient to home care nurse, and assist in transition from hospital to home.

For more information, see Chapter 39 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Constipation

Constipation refers to an abnormal infrequency or irregularity of defecation, abnormal hardening of stools that makes their passage difficult and sometimes painful, decrease in stool volume, or prolonged retention of stool in the rectum. It can be caused by certain medications; rectal or anal disorders; obstruction; metabolic, neurologic, and neuromuscular conditions; endocrine disorders; lead poisoning; connective tissue disorders; and a variety of disease conditions. Other causes may include weakness, immobility, debility, fatigue, and inability to increase intra-abdominal pressure to pass stools. Constipation develops when people do not take the time or ignore the urge to defecate or as the result of dietary habits (low consumption of fiber and inadequate fluid intake), lack of regular exercise, and a stress-filled life. Perceived constipation is a subjective problem that occurs when an individual's bowel elimination pattern is not consistent with what he or she perceives as normal. Chronic laxative use contributes to this problem.

Clinical Manifestations

- Fewer than three bowel movements per week, abdominal distention, and pain and pressure
- Decreased appetite, headache, fatigue, indigestion, sensation of incomplete emptying
- Straining at stool; elimination of small volume of hard, dry stool
- Complications such as hypertension, hemorrhoids and fissures, fecal impaction, and megacolon

Assessment and Diagnostic Methods

Diagnosis is based on history, physical examination, possibly a barium enema or sigmoidoscopy, stool for occult blood, anorectal manometry (pressure studies), defecography, and colonic transit studies. Newer tests such as pelvic floor MRI may identify occult pelvic floor defects.

Medical Management

- Treatment should target the underlying cause of constipation and aim to prevent recurrence, including education, bowel habit training, increased fiber and fluid intake, and judicious use of laxatives.
- Discontinue laxative abuse; increase fluid intake; include fiber in diet; try biofeedback, exercise routine to strengthen abdominal muscles.
- If laxative is necessary, use bulk-forming agents, saline and osmotic agents, lubricants, stimulants, or fecal softeners.
- Specific medication therapy to increase intrinsic motor function (eg, cholinergics, cholinesterase inhibitors, or prokinetic agents).

Nursing Management

Assessment

Use tact and respect with patient when talking about bowel habits and obtaining health history. Note the following:

- Onset and duration of constipation, current and past elimination patterns, patient's expectation of normal bowel elimination, and lifestyle information (eg, exercise and activity level, occupation, food and fluid intake, and stress level).
- Past medical and surgical history, current medications, history of laxative or enema use.
- Report of any of the following: rectal pressure or fullness, abdominal pain, straining at defecation, and flatulence.
- Sets specific goals for teaching; goals for the patient include restoring or maintaining a regular pattern of elimination by responding to the urge to defecate, ensuring adequate intake of fluids and high-fiber foods, learning about methods to avoid constipation, relieving anxiety

about bowel elimination patterns, and avoiding complications.

For more information, see Chapter 38 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Contact Dermatitis

Contact dermatitis is an inflammatory reaction of the skin to physical, chemical, or biologic agents. It may be of the primary irritant type, or it may be allergic. The epidermis is damaged by repeated physical and chemical irritation. Common causes of irritant dermatitis are soaps, detergents, scouring compounds, and industrial chemicals. Predisposing factors include extremes of heat and cold, frequent use of soap and water, and a preexisting skin disease.

Clinical Manifestations

- Eruptions when the causative agent contacts the skin.
- Itching, burning, and erythema are followed by edema, papules, vesicles, and oozing or weeping as first reactions.
- In the subacute phase, the vesicular changes are less marked and alternate with crusting, drying, fissuring, and peeling.
- If repeated reactions occur or the patient continually scratches the skin, lichenification and pigmentation occur; secondary bacterial invasion may follow.

Medical Management

- Soothe and heal the involved skin and protect it from further damage.
- Determine the distribution pattern of the reaction to differentiate between allergic type and irritant type.
- Identify and remove the offending irritant; soap is generally not used on site until healed.
- Use bland, unmedicated lotions for small patches of erythema; apply cool wet dressings over small areas of vesicular dermatitis; a corticosteroid ointment may be used.

- Medicated baths at room temperature are prescribed for larger areas of dermatitis.
- In severe, widespread conditions, a short course of systemic steroids may be prescribed.

Nursing Management

Instruct patient to adhere to the following instructions for at least 4 months, until the skin appears completely healed:

- Think about what may have caused the problem.
- Avoid contact with the irritants, or wash skin thoroughly immediately after exposure to the irritants.
- Avoid heat, soap, and rubbing the skin.
- Choose bath soaps, detergents, and cosmetics that do not contain fragrance; avoid using a fabric softener dryer sheet.
- Avoid topical medications, lotions, or ointments, except when prescribed.
- When wearing gloves (eg, for washing dishes, cleaning), make sure they are cotton-lined; do not wear for more than 15 to 20 minutes at a time.

For more information, see Chapter 56 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, F. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Coronary Atherosclerosis and CAD

Coronary atherosclerosis is the most common cause of cardiovascular disease in the United States and is characterized by an abnormal accumulation of lipid or fatty substances and fibrous tissue in the vessel wall. These substances block or narrow the vessel, reducing blood flow to the myocardium. Atherosclerosis involves a repetitious inflammatory response to injury of the artery wall and subsequent alteration in the structural and biochemical properties of the arterial walls.

Risk Factors

Modifiable

- High blood cholesterol (hyperlipidemia)
- Cigarette smoking, tobacco use

- Elevated blood pressure
- Hyperglycemia (diabetes mellitus)
- Metabolic syndrome
- Obesity
- Physical inactivity

Not Modifiable

- Positive family history (a first-degree relative with cardiovascular disease at age 55 years or younger for males and at age 65 years or younger for females)
- Age (more than 45 years for men, more than 55 years for women)
- Gender (men develop cardiovascular disease at an earlier age than do women)
- Race (higher incidence in African Americans than in Caucasians)

Clinical Manifestations

Symptoms and complications develop according to the location and degree of narrowing of the arterial lumen, thrombus formation, and obstruction of blood flow to the myocardium. Symptoms include the following:

- Ischemia
- Chest pain: angina pectoris
- Atypical symptoms of myocardial ischemia (shortness of breath, nausea, and weakness)
- Myocardial infarction
- Dysrhythmias, sudden death

Assessment and Diagnostic Methods

Identification of risk factors for coronary heart disease (CHD) primarily involves taking a thorough history, including family history, physical examination (note blood pressure and weight), and laboratory work (eg, cholesterol levels [low-density lipoprotein (LDL) to high-density lipoprotein (HDL)], glucose).

Prevention

The major management goal is prevention of CHD. Four modifiable risk factors—cholesterol abnormalities, tobacco use, hypertension, and diabetes mellitus—have been cited as

major risk factors for CAD and its complications. As a result, they receive much attention in health promotion programs.

Medical Management

See "Medical Management" under "Angina Pectoris" and "Myocardial Infarction" for additional information.

Nursing Management

See "Nursing Management" under "Angina Pectoris" and "Acute Coronary Syndrome and Myocardial Infarction" for additional information.

For more information, see Chapter 28 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cushing Syndrome

Cushing syndrome results from excessive, rather than deficient, adrenocortical activity. It is commonly caused by use of corticosteroid medications and is infrequently the result of excessive corticosteroid production secondary to hyperplasia of the adrenal cortex. It may be caused by several mechanisms, including a tumor of the pituitary gland or less commonly an ectopic malignancy that produces adrenocorticotropic hormone (ACTH). Regardless of the cause, the normal feedback mechanisms that control the function of the adrenal cortex become ineffective, resulting in oversecretion of glucocorticoids, androgens, and possibly mineralocorticoid. Cushing syndrome occurs five times more often in women ages 20 to 40 years than in men.

Clinical Manifestations

- Arrested growth, weight gain and obesity, musculoskeletal changes, and glucose intolerance.
- Classic features: central-type obesity, with a fatty "buffalo hump" in the neck and supraclavicular areas, a heavy trunk, and relatively thin extremities; skin is thin, fragile, easily traumatized, with ecchymoses and striae.
- Weakness and lassitude; sleep is disturbed because of altered diurnal secretion of cortisol.

- Excessive protein catabolism with muscle wasting and osteoporosis; kyphosis, backache, and compression fractures of the vertebrae are possible.
- Retention of sodium and water, producing hypertension and heart failure.
- "Moon-faced" appearance, oiliness of skin and acne.
- Increased susceptibility to infection; slow healing of minor cuts and bruises.
- Hyperglycemia or overt diabetes.
- Virilization in females (due to excess androgens) with appearance of masculine traits and recession of feminine traits (eg, excessive hair on face, breasts atrophy, menses cease, clitoris enlarges, and voice deepens); libido is lost in males and females.
- Changes occur in mood and mental activity; psychosis may develop and distress and depression are common.
- If Cushing's syndrome is the result of a pituitary tumor, visual disturbances are possible because of pressure on the optic chiasm.

Assessment and Diagnostic Findings

- Overnight dexamethasone suppression test to measure plasma cortisol level (stress, obesity, depression, and medications may falsely elevate results).
- Laboratory studies (eg, serum sodium, blood glucose, serum potassium, plasma, urinary); 24-hour urinary free cortisol level.
- CT, ultrasound, or MRI scan or ultrasound may localize adrenal tissue and detect adrenal tumors.

Medical Management

Treatment is usually directed at the pituitary gland because most cases are due to pituitary tumors rather than tumors of the adrenal cortex.

- Surgical removal of the tumor by transsphenoidal hypophysectomy is the treatment of choice (80% success rate).
- Radiation of the pituitary gland is successful but takes several months for symptom control.
- Adrenalectomy is performed in patients with primary adrenal hypertrophy.

- Postoperatively, temporary replacement therapy with hydrocortisone may be necessary until the adrenal glands begin to respond normally (may be several months).
- If bilateral adrenalectomy was performed, lifetime replacement of adrenal cortex hormones is necessary.
- Adrenal enzyme inhibitors (eg, metyrapone, aminoglutethimide, mitotane, ketoconazole) may be used with ectopic ACTH-secreting tumors that cannot be totally removed; monitor closely for inadequate adrenal function and side effects.
- If Cushing syndrome results from exogenous corticosteroids, taper the drug to the minimum level or use alternate-day therapy to treat the underlying disease.

NURSING PROCESS

The Patient with Cushing Syndrome

Assessment

- Focus on the effects on the body of high concentrations of adrenal cortex hormones.
- Assess patient's level of activity and ability to carry out routine and self-care activities.
- Observe skin for trauma, infection, breakdown, bruising, and edema.
- Note changes in appearance and patient's responses to these changes; family is good source of information about patient's emotional status and changes in appearance.
- Assess patient's mental function, including mood, response to questions, depression, and awareness of environment.

Diagnosis

Nursing Diagnoses

- Risk for injury related to weakness
- Risk for infection related to altered protein metabolism and inflammatory response
- Self-care deficits related to weakness, fatigue, muscle wasting, and altered sleep patterns
- Impaired skin integrity related to edema, impaired healing, and thin and fragile skin

- Disturbed body image related to altered appearance, impaired sexual functioning, and decreased activity level
- Disturbed thought processes related to mood swings, irritability, and depression

Collaborative Problems/Potential Complications

- Addisonian crisis
- Adverse effects of adrenocortical activity

Planning and Goals

Major goals include decreased risk of injury, decreased risk of infection, increased ability to carry out self-care activities, improved skin integrity, improved body image, improved mental function, and absence of complications.

Nursing Interventions

Decreasing Risk of Injury

- Provide a protective environment to prevent falls, fractures, and other injuries to bones and soft tissues.
- Assist the patient who is weak in ambulating to prevent falls or colliding into furniture.
- Recommend foods high in protein, calcium, and vitamin D to minimize muscle wasting and osteoporosis; refer to dietitian for assistance.

Decreasing Risk of Infection

- Avoid unnecessary exposure to people with infections.
- Assess frequently for subtle signs of infections (corticosteroids mask signs of inflammation and infection).

Preparing Patient for Surgery

Monitor blood glucose levels, and assess stools for blood because diabetes mellitus and peptic ulcer are common problems (see also “Preoperative Preparation” under “Preoperative and Postoperative Nursing Management” in Chapter P).

Encouraging Rest and Activity

- Encourage moderate activity to prevent complications of immobility and promote self-esteem.

- Plan rest periods throughout the day and promote a relaxing, quiet environment for rest and sleep.

Promoting Skin Integrity

- Use meticulous skin care to avoid traumatizing fragile skin.
- Avoid adhesive tape, which can tear and irritate the skin.
- Assess skin and bony prominences frequently.
- Encourage and assist patient to change positions frequently.

Improving Body Image

- Discuss the impact that changes have had on patient's self-concept and relationships with others. Major physical changes will disappear in time if the cause of Cushing syndrome can be treated.
- Weight gain and edema may be modified by a low-carbohydrate, low-sodium diet; a high-protein intake can reduce some bothersome symptoms.

Improving Thought Processes

- Explain to patient and family the cause of emotional instability, and help them cope with mood swings, irritability, and depression.
- Report any psychotic behavior.
- Encourage patient and family members to verbalize feelings and concerns.

Monitoring and Managing Complications

- Adrenal hypofunction and addisonian crisis: Monitor for hypotension; rapid, weak pulse; rapid respiratory rate; pallor; and extreme weakness. Note factors that may have led to crisis (eg, stress, trauma, surgery).
- Administer IV fluids and electrolytes and corticosteroids before, during, and after surgery or treatment as indicated.
- Monitor for circulatory collapse and shock present in addisonian crisis; treat promptly.
- Assess fluid and electrolyte status by monitoring laboratory values and daily weight.
- Monitor blood glucose level, and report elevations to physician.

Teaching Patients Self-Care

- Present information about Cushing syndrome verbally and in writing to patient and family.
- If indicated, stress to patient and family that stopping corticosteroid use abruptly and without medical supervision can result in adrenal insufficiency and reappearance of symptoms.
- Emphasize the need to keep an adequate supply of the corticosteroid to prevent running out or skipping a dose, because this could result in addisonian crisis.
- Stress the need for dietary modifications to ensure adequate calcium intake without increasing risk for hypertension, hyperglycemia, and weight gain.
- Teach patient and family to monitor blood pressure, blood glucose levels, and weight.
- Stress the importance of wearing a medical alert bracelet and notifying other health professionals (eg, dentist) that he or she has Cushing syndrome.
- Refer for home care as indicated to ensure safe environment with minimal stress and risk for falls and other side effects.
- Emphasize importance of regular medical follow-up, and ensure patient is aware of side and toxic effects of medications.

Evaluation

Expected Patient Outcomes

- Has decreased risk of injury
- Has decreased risk of infection
- Increases participation in self-care activities
- Attains or maintains skin integrity
- Achieves improved body image
- Exhibits improved mental functioning
- Experiences no complications

For more information, see Chapter 42 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Cystitis (Lower UTI)

Cystitis is an inflammation of the urinary bladder. The most common route of infection is transurethral, often from fecal contamination, ureterovesical reflux, or the use of a catheter or cystoscope. Bacteria may enter the urinary tract in three ways: by the transurethral route (ascending infection), through the bloodstream (hematogenous spread), or by means of a fistula from the intestine (direct extension). Cystitis occurs more often in women, particularly sexually active women. Cystitis in men is secondary to some other factor (eg, infected prostate, epididymitis, or bladder stones).

Clinical Manifestations

- Urgency, frequency, burning, and pain on urination.
- Nocturia, incontinence, and back, suprapubic, or pelvic pain.
- Hematuria.
- With complicated UTIs (eg, patients with indwelling catheters), symptoms can range from asymptomatic bacteriuria to a Gram-negative sepsis with shock.

Assessment and Diagnostic Methods

- Urine cultures, colony counts, cellular studies
- Leukocyte esterase test and nitrite testing
- Tests for sexually transmitted diseases (STDs)
- CT scans and transrectal ultrasonography; cystourethroscopy may be indicated to visualize the ureters or to detect strictures, calculi, or tumors

Gerontologic Considerations

Elderly patients often lack the typical symptoms of UTI and sepsis. Nonspecific symptoms, such as altered sensorium, lethargy, anorexia, new incontinence, hyperventilation, and low-grade fever may be the only clues to cystitis in these patients.

Medical Management

Management of UTIs typically involves pharmacologic therapy and patient education. The nurse teaches the patient about prescribed medication regimens and infection prevention measures.

Acute Pharmacologic Therapy

C

- Ideal treatment is an antibacterial agent that eradicates bacteria from the urinary tract with minimal effects on fecal and vaginal flora.
- Medications may include Cephalexin (Keflex), Cotrimoxazole (TMP-SMZ, Bactrim Septra), Nitrofurantoin (Macrodantin Furadantin), ciprofloxacin (Cipro), levofloxacin (Levaquin), and Phenazopyridine (Pyridium).
- Occasionally, ampicillin or amoxicillin (but *Escherichia coli* has developed resistance to these agents).

Long-Term Pharmacologic Therapy

- About 20% of women treated for uncomplicated UTIs experience a recurrence.
- Recurrence in men is usually due to persistence of the same organism; further evaluation and treatment are indicated. Reinfection of women with new bacteria is more common than persistence of the initial bacteria.
- If diagnostic evaluation reveals no structural abnormalities, patient may be instructed to begin treatment on own, testing urine with a dipstick whenever symptoms occur, and to contact health care provider only with persistence of symptoms, at the occurrence of fever, or if the number of treatment episodes exceeds four in a 6-month period.
- Long-term use of antimicrobial agents decreases risk of reinfection.

NURSING PROCESS

The Patient with Cystitis

Assessment

- Take careful history of urinary signs and symptoms.
- Assess for pain and urinary frequency, urgency, and hesitancy and changes in urine.
- Determine usual pattern of voiding to detect factors that may predispose patient to infection.
- Assess for infrequent emptying of the bladder, association of symptoms of UTIs with sexual intercourse, contraceptive practices, and personal hygiene.

- Check urine for volume, color, concentration, cloudiness, and odor.

Diagnosis

Nursing Diagnoses

- Acute pain related to infection within the urinary tract
- Deficient knowledge related to factors predisposing to infection and recurrence, detection and prevention of recurrence, and pharmacologic therapy

Collaborative Problems/Potential Complications

- Sepsis
- Renal failure, which may occur as the long-term result of either an extensive infective or inflammatory process

Planning and Goals

Goals of the patient may include relief of pain and discomfort, increased knowledge of preventive measures and treatment modalities, and absence of complications.

Nursing Interventions

Relieving Pain

- Use antispasmodic drugs to relieve bladder irritability and pain.
- Relieve pain and spasm with analgesic agents and heat to the perineum.
- Encourage patient to drink liberal amounts of fluid (water is best).
- Instruct patient to avoid urinary tract irritants (eg, coffee, tea, citrus, spices, colas, alcohol).
- Encourage frequent voiding (every 2 to 3 hours).

Monitoring and Managing Complications

- Recognize and teach patient to recognize the signs and symptoms of UTIs early; initiate prompt treatment.
- Manage UTIs with appropriate antimicrobial therapy, liberal fluids, frequent voiding, and hygiene measures.
- Instruct patient to notify physician if fatigue, nausea, vomiting, or pruritus occurs.
- Provide for periodic monitoring of renal function and evaluation for strictures, obstructions, or stones.

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- Avoid indwelling catheters if possible; remove at earliest opportunity. Use strict aseptic technique if an indwelling catheter is necessary.
- Check vital signs and level of consciousness for impending sepsis.
- Report positive blood cultures and elevated WBC counts.

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE

- Teach patient health-related behaviors that help prevent recurrent UTIs, including practicing careful personal hygiene, increasing fluid intake to promote voiding and dilution of urine, urinating regularly and more frequently, and adhering to the therapeutic regimen.
- Teaching should meet the patient's individual needs.

Evaluation

Expected Patient Outcomes

- Experiences relief of pain
- Explains UTIs and their treatment
- Experiences no complications

For more information, see Chapter 45 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.



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Diabetes Insipidus

Diabetes insipidus is a disorder of the posterior lobe of the pituitary gland that is characterized by a deficiency of antidiuretic hormone (ADH) (vasopressin). Excessive thirst (polydipsia) and large volumes of dilute urine characterize the disorder. It may occur secondary to head trauma, brain tumor, or surgical ablation or irradiation of the pituitary gland. It may also occur with infections of the central nervous system (meningitis, encephalitis, tuberculosis) or with tumors (eg, metastatic disease, lymphoma of the breast or lung). Another cause of diabetes insipidus is failure of the renal tubules to respond to ADH; this nephrogenic form may be related to hypokalemia, hypercalcemia, and a variety of medications (eg, lithium, demeclocycline [Declomycin]).

The disease cannot be controlled by limiting fluid intake, because the high-volume loss of urine continues even without fluid replacement. Attempts to restrict fluids cause the patient to experience an insatiable craving for fluid and to develop hypernatremia and severe dehydration.

Clinical Manifestations

- Polyuria: Enormous daily output of very dilute urine (specific gravity 1.001 to 1.005). Primary diabetes insipidus may have an abrupt onset or an insidious onset in adults.
- Polydipsia: Patient experiences intense thirst, drinking 2 to 20 L of fluid daily, with a special craving for cold water.
- Polyuria continues even without fluid replacement.
- If diabetes insipidus is inherited, the primary symptoms may begin at birth; in adults, onset may be insidious or abrupt.

Assessment and Diagnostic Findings

- Fluid deprivation test: Fluids are withheld for 8 to 12 hours until 3% to 5% of the body weight is lost. Inability to

increase specific gravity and osmolality of the urine during test is characteristic of diabetes insipidus.

- Other diagnostic procedures include concurrent measurements of plasma levels of ADH and plasma and urine osmolality as well as a trial of desmopressin (synthetic vasopressin) therapy and intravenous (IV) infusion of hypertonic saline solution.

Medical Management

The objectives of therapy are (1) to replace ADH (which is usually a long-term therapeutic program), (2) to ensure adequate fluid replacement, and (3) to identify and correct the underlying intracranial pathology. Nephrogenic causes require different management approaches.

Pharmacologic Therapy

- Desmopressin (DDAVP), administered intranasally, one or two administrations daily to control symptoms.
- Intramuscular administration of ADH (vasopressin tannate in oil) every 24 to 96 hours to reduce urinary volume (shake vigorously or warm; administer in the evening; rotate injection sites to prevent lipodystrophy).
- Clofibrate (Atromid-S), a hypolipidemic agent, has been found to have an antidiuretic effect on patients who have some residual hypothalamic vasopressin; chlorpropamide (Diabinese) and thiazide diuretics are also used in mild forms of the disease because they potentiate the action of vasopressin.
- Thiazide diuretics, mild salt depletion, and prostaglandin inhibitors (ibuprofen [Advil, Motrin], indomethacin [Indocin], and aspirin) are used to treat the nephrogenic form of diabetes insipidus.

Nursing Management

- Instruct patient and family members about follow-up care and emergency measures.
- Provide specific verbal and written instructions, including the actions and adverse effects of all medications; demonstrate correct medication administration and observe return demonstrations.

- Advise patient to wear a medical identification bracelet and to carry medication information about this disorder at all times.

For more information, see Chapter 42 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L, & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Diabetes Mellitus

Diabetes mellitus is a group of metabolic disorders characterized by elevated levels of blood glucose (hyperglycemia) resulting from defects in insulin secretion, insulin action, or both. Three major acute complications of diabetes related to short-term imbalances in blood glucose levels are hypoglycemia, diabetic ketoacidosis (DKA), and hyperglycemic hyperosmolar nonketotic syndrome (HHNS). Long-term hyperglycemia may contribute to chronic microvascular complications (kidney and eye disease) and neuropathic complications. Diabetes is also associated with an increased occurrence of macrovascular diseases, including coronary artery disease (myocardial infarction), cerebrovascular disease (stroke), and peripheral vascular disease.

Types of Diabetes

Type 1 (Formerly Insulin-Dependent Diabetes Mellitus)

- About 5% to 10% of patients with diabetes have type 1 diabetes. It is characterized by destruction of the pancreatic beta-cells due to genetic, immunologic, and possibly environmental (eg, viral) factors. Insulin injections are needed to control the blood glucose levels.
- Type 1 diabetes has a sudden onset, usually before the age of 30 years.

Type 2 (Formerly Non–Insulin-Dependent Diabetes Mellitus)

- About 90% to 95% of patients with diabetes have type 2 diabetes. It results from a decreased sensitivity to insulin (insulin resistance) or from a decreased amount of insulin production.
- Type 2 diabetes is first treated with diet and exercise, and then with oral hypoglycemic agents as needed.

- Type 2 diabetes occurs most frequently in patients older than 30 years and in patients with obesity.

Gestational Diabetes Mellitus

- Gestational diabetes is characterized by any degree of glucose intolerance with onset during pregnancy (second or third trimester).
- Risks for gestational diabetes include marked obesity, a personal history of gestational diabetes, glycosuria, or a strong family history of diabetes. High-risk ethnic groups include Hispanic Americans, Native Americans, Asian Americans, African Americans, and Pacific Islanders. It increases their risk for hypertensive disorders of pregnancy.

Clinical Manifestations

- Polyuria, polydipsia, and polyphagia.
- Fatigue and weakness, sudden vision changes, tingling or numbness in hands or feet, dry skin, skin lesions or wounds that are slow to heal, and recurrent infections.
- Onset of type 1 diabetes may be associated with sudden weight loss or nausea, vomiting, or stomach pains.
- Type 2 diabetes results from a slow (over years), progressive glucose intolerance and results in long-term complications if diabetes goes undetected for many years (eg, eye disease, peripheral neuropathy, peripheral vascular disease). Complications may have developed before the actual diagnosis is made.
- Signs and symptoms of DKA include abdominal pain, nausea, vomiting, hyperventilation, and a fruity breath odor. Untreated DKA may result in altered level of consciousness, coma, and death.

Assessment and Diagnostic Methods

- High blood glucose levels: fasting plasma glucose levels 126 mg/dL or more, or random plasma glucose or 2-hour post-load glucose levels more than 200 mg/dL
- Evaluation for complications

Prevention

For patients who are obese (especially those with type 2 diabetes), weight loss is the key to treatment and the major preventive factor for the development of diabetes.

Complications of Diabetes

Complications associated with diabetes are classified as acute and chronic. Acute complications occur from short-term imbalances in blood glucose and include the following:

- Hypoglycemia
- DKA
- HHNS

Chronic complications generally occur 10 to 15 years after the onset of diabetes mellitus. The complications include the following:

- Macrovascular (large vessel) disease: affects coronary, peripheral vascular, and cerebral vascular circulations
- Microvascular (small vessel) disease: affects the eyes (retinopathy) and kidneys (nephropathy); control blood glucose levels to delay or avoid onset of both microvascular and macrovascular complications
- Neuropathic disease: affects sensory motor and autonomic nerves and contributes to such problems as impotence and foot ulcers

Gerontologic Considerations

Because the incidence of elevated blood glucose levels increases with advancing age, elderly adults should be advised that physical activity that is consistent and realistic is beneficial to those with diabetes. Advantages of exercise include a decrease in hyperglycemia, a general sense of well-being, and better use of ingested calories, resulting in weight reduction. Consider physical impairment from other chronic diseases when planning an exercise regimen for elderly patients with diabetes.

Medical Management

The main goal of treatment is to normalize insulin activity and blood glucose levels to reduce the development of vascular and neuropathic complications. The therapeutic goal within each type of diabetes is to achieve normal blood glucose levels (euglycemia) without hypoglycemia and without seriously disrupting the patient's usual activities. There are five

components of management for diabetes: nutrition, exercise, monitoring, pharmacologic therapy, and education.

- Primary treatment of type 1 diabetes is insulin.
- Primary treatment of type 2 diabetes is weight reduction.
- Exercise is important in enhancing the effectiveness of insulin.
- Use oral hypoglycemic agents if diet and exercise are not successful in controlling blood glucose levels. Insulin injections may be used in acute situations.
- Because treatment varies throughout the course because of changes in lifestyle and physical and emotional status as well as advances in therapy, continuously assess and modify treatment plan as well as daily adjustments in therapy. Education is needed for both patient and family.

Nutritional Management

- Goals are to achieve and maintain blood glucose and blood pressure levels in the normal range (or as close to normal as safely possible) and a lipid and lipoprotein profile that reduces the risk for vascular disease; to prevent, or at least slow, the rate of development of chronic complications; to address individual nutrition needs; and to maintain the pleasure of eating by only limiting food choices when indicated by scientific evidence.
- Meal plan should consider the patient's food preferences, lifestyle, usual eating times, and ethnic and cultural background.
- For patients who require insulin to help control blood glucose levels, consistency is required in maintaining calories and carbohydrates consumed at different meals.
- Initial education addresses the importance of consistent eating habits, the relationship of food and insulin, and the provision of an individualized meal plan. In-depth follow-up education then focuses on management skills, such as eating at restaurants; reading food labels; and adjusting the meal plan for exercise, illness, and special occasions.

Caloric Requirements

- Determine basic caloric requirements, taking into consideration age, gender, body weight, and height and factoring in degree of activity.

- Long-term weight reduction can be achieved (1 to 2 lb loss per week) by reducing basic caloric intake by 500 to 1,000 cal from calculated basic caloric requirements.
- The American Diabetes and American Dietetic Associations recommend that for all levels of caloric intake, 50% to 60% of calories be derived from carbohydrates, 20% to 30% from fat, and the remaining 10% to 20% from protein. Using food combinations to lower the glycemic response (glycemic index) can be useful. Carbohydrate counting and the food guide pyramid can be useful tools.

Nursing Management

Nursing management of patients with diabetes can involve treatment of a wide variety of physiologic disorders, depending on the patient's health status and whether the patient is newly diagnosed or seeking care for an unrelated health problem. Because all patients with diabetes must master the concepts and skills necessary for long-term management and avoidance of potential complications of diabetes, a solid educational foundation is necessary for competent self-care and is an ongoing focus of nursing care.

Providing Patient Education

Diabetes mellitus is a chronic illness that requires a lifetime of special self-management behaviors. Nurses play a vital role in identifying patients with diabetes, assessing self-care skills, providing basic education, reinforcing the teaching provided by the specialist, and referring patients for follow-up care after discharge.

Developing a Diabetic Teaching Plan

- Determine how to organize and prioritize the vast amount of information that must be taught to patients with diabetes. Many hospitals and outpatient diabetes centers have devised written guidelines, care plans, and documentation forms that may be used to document and evaluate teaching.
- The American Association of Diabetes Educators recommends organizing education using the following seven tips for managing diabetes: healthy eating, being active, monitoring, taking medication, problem solving, healthy coping, and reducing risks.

- Another general approach is to organize information and skills into two main types: basic, initial ("survival") skills and information, and in-depth (advanced) or continuing education.
- Basic information is literally what patients must know to survive (eg, to avoid severe hypoglycemic or acute hyperglycemic complications after discharge) and includes simple pathophysiology; treatment modalities; recognition, treatment, and prevention of acute complications; and other pragmatic information (eg, where to buy and store insulin, how to contact physician).
- In-depth and continuing education involves teaching more detailed information related to survival skills as well as teaching preventive measures for avoiding long-term diabetic complications, such as foot care, eye care, general hygiene, and risk factor management (eg, blood pressure control and blood glucose normalization). More advanced continuing education may include alternative methods for insulin delivery, for example.

Assessing Readiness to Learn

- Assess the patient's (and family's) readiness to learn; assess the patient's coping strategies and reassure the patient and family that feelings of depression and shock are normal.
- Ask the patient and family about their major concerns or fears in order to learn about any misinformation that may be contributing to anxiety; provide simple, direct information to dispel misconceptions.
- Evaluate the patient's social situation for factors that may influence the diabetes treatment and education plan (eg, low literacy level, limited financial resources or lack of health insurance, presence or absence of family support, typical daily schedule, any neurologic deficits).

Teaching Experienced Patients

- Continue to assess the skills and self-care behaviors of patients who have had diabetes for many years, including direct observation of skills, not just the patient's self-report of self-care behaviors.
- Ensure these patients are fully aware of preventive measures related to foot care, eye care, and risk factor management.

- Encourage patient to discuss feelings and fears related to complications; provide appropriate information regarding diabetic complications.

Determining Teaching Methods

- Maintain flexibility with regard to teaching approaches; a teaching method for one patient might not work for another.
- If desired, use various tools to complement teaching (eg, booklets, video tapes).
- Written handouts should match the patient's learning needs (including different languages, low-literacy information, large print) and reading level.
- Encourage patients to continue learning about diabetes care by participating in activities sponsored by local hospitals and diabetes organizations; inform patient that magazines and Web sites with information on diabetes management are available.

Teaching Patients to Self-Administer Insulin

Insulin injections are self-administered into the subcutaneous tissue with the use of special insulin syringes. Basic information includes explanations of the equipment, insulins, and syringes and how to mix insulin.

- Storing insulin: Vials not in use, including spare vials, should be refrigerated; extremes of temperature should be avoided; insulin should not be allowed to freeze and should not be kept in direct sunlight or in a hot car; insulin vial in use should be kept at room temperature (for up to 1 month). Instruct patient to always have a spare vial of the type or types of insulin needed. Also instruct patient to thoroughly mix any cloudy insulins by gently inverting the vial or rolling it between the hands before drawing the solution into a syringe or a pen and to discard any bottles of intermediate-acting insulin showing evidence of flocculation (a frosted, whitish coating inside the bottle).
- Selecting syringes: Syringes must be matched with the insulin concentration (U-100 is standard in the United States); currently, three sizes of U-100 insulin syringes are available (1-mL syringes that hold 100 units, 0.5-mL

syringes that hold 50 units, and 0.3-mL syringes that hold 30 units). Small syringes allow patients who require small amounts of insulin to measure and draw up the amount of insulin accurately. Patients who require large amounts of insulin use larger syringes. Smaller syringes (marked in 1-unit increments) may be easier to use for patients with visual deficits. Very thin patients and children may require smaller needles.

- Mixing insulins: The most important issues are (1) that patients be consistent in technique, so as not to draw up the wrong dose in error or the wrong type of insulin, and (2) that patients not inject one type of insulin into the bottle containing a different type of insulin. Patients who have difficulty mixing insulins may use a premixed insulin, have prefilled syringes prepared, or take two injections.
- Withdrawing insulin: Most (if not all) of the printed materials available on insulin dose preparation instruct patients to inject air into the bottle of insulin equivalent to the number of units of insulin to be withdrawn; this is to prevent the formation of a vacuum inside the bottle, which would make it difficult to withdraw the proper amount of insulin.
- Selecting and rotating the injection site: The four main areas for injection are the abdomen (fastest absorption), upper arms (posterior surface), thighs (anterior surface), and hips (slowest absorption). Systematic rotation of injection sites within an anatomic area is recommended; encourage the patient to use all available injection sites within one area rather than randomly rotating sites from area to area. The patient should try not to use the same site more than once in 2 to 3 weeks.
- Preparing the skin: Use of alcohol to cleanse the skin is not recommended, but patients who have learned this technique often continue to use it; caution these patients to allow the skin to dry after cleansing with alcohol to avoid carrying it into the tissues, which can result in a localized reddened area and a burning sensation.
- Inserting the needle: The correct technique is based on the need for the insulin to be injected into the subcutaneous tissue; injection that is too deep or too shallow may affect the

rate of absorption; a 90-degree insertion angle is best for most patients. Aspiration is generally not recommended with self-injection of insulin.

- Disposing of syringes and needles: Insulin syringes and pens, needles, and lancets should be disposed of according to local regulations. If community disposal programs are unavailable, used sharps should be placed in a puncture-resistant container. Instruct patient to contact local trash authorities for instructions about proper disposal of filled containers.

Promoting Home- and Community-Based Care

Promoting Self-Care

- If problems exist with glucose control or with the development of preventable complications, assess the reasons for the patient's ineffective management of the treatment regimen; do not assume that problems with diabetes management are related to the patient's willful decision to ignore self-management; problem may be correctable simply through providing complete information and ensuring that the patient understands the information.
- Assess for certain physical (eg, decreased visual acuity) or emotional factors (eg, denial, depression) may be impairing the patient's ability to perform self-care skills.
- Help patient whose family, personal, or work problems may be of higher priority than self-care to establish priorities.
- Assess the patient for infection or emotional stress, which may lead to elevated blood glucose levels despite adherence to the treatment regimen.
- Promote self-care management skills by addressing any underlying factors that may affect diabetic control, simplifying and/or adjusting the treatment regimen, establishing a specific plan or contract with the patient, providing positive reinforcement, helping patient identify personal motivating factors, and encouraging the patient to pursue life goals and interests.

Continuing Care

- Age, socioeconomic level, existing complications, type of diabetes, and comorbid conditions all may dictate the frequency of follow-up visits.

- In addition to individualized follow-up appointments, remind the patient to participate in recommended health promotion activities (eg, immunizations) and age-appropriate health screenings (eg, pelvic examinations, mammograms).
- Encourage all patients with diabetes to participate in support groups.

D

For more information, see Chapter 41 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Diabetic Ketoacidosis

DKA is caused by an absence or markedly inadequate amount of insulin. This results in disorders in the metabolism of carbohydrates, protein, and fat. The three main clinical features of DKA are (1) hyperglycemia, due to decreased use of glucose by the cells and increased production of glucose by the liver; (2) dehydration and electrolyte loss, resulting from polyuria, with a loss of up to 6.5 L of water and up to 400 to 500 mEq each of sodium, potassium, and chloride over 24 hours; and (3) acidosis, due to an excess breakdown of fat to fatty acids and production of ketone bodies, which are also acids. Three main causes of DKA are decreased or missed dose of insulin, illness or infection, and initial manifestation of undiagnosed or untreated diabetes.

Clinical Manifestations

- Polyuria and polydipsia (increased thirst).
- Blurred vision, weakness, and headache.
- Orthostatic hypotension in patients with volume depletion.
- Frank hypotension with weak, rapid pulse.
- Gastrointestinal symptoms, such as anorexia, nausea/vomiting, and abdominal pain (may be severe).
- Acetone breath (fruity odor).
- Kussmaul respirations: hyperventilation with very deep, but not labored, respirations.
- Mental status varies widely from patient to patient (alert to lethargic or comatose).

Assessment and Diagnostic Findings

- Blood glucose level: 300 to 800 mg/dL (may be lower or higher).
- Low serum bicarbonate level: 0 to 15 mEq/L.
- Low pH: 6.8 to 7.3.
- Low $PaCO_2$: 10 to 30 mm Hg.
- Sodium and potassium levels may be low, normal, or high depending on amount of water loss (dehydration).
- Elevated creatinine, blood urea nitrogen (BUN), and hematocrit values may be seen with dehydration. After rehydration, continued elevation in the serum creatinine and BUN levels suggests underlying renal insufficiency.

Medical Management

In addition to treating hyperglycemia, management of DKA is aimed at correcting dehydration, electrolyte loss, and acidosis.

Rehydration

Patients may need as much as 6 to 10 L of IV fluid (0.9% normal saline [NS] is administered at a high rate of 0.5 to 1 L/h for 2 to 3 hours) to replace fluid loss caused by polyuria, hyperventilation, diarrhea, and vomiting. Hypotonic (0.45%) NS solution may be used for hypertension or hypernatremia and for those at risk for heart failure. This is the fluid of choice (200 to 500 mL/h for several additional hours) after the first few hours, provided that blood pressure is stable and sodium level is not low. When the blood glucose level reaches 300 mg/dL (16.6 mmol/L) or less, the IV solution may be changed to dextrose 5% in water (D_5W) to prevent a precipitous decline in the blood glucose level. Plasma expanders may be used to correct severe hypotension that does not respond to IV fluid treatment.

Restoring Electrolytes

Potassium is the main electrolyte of concern in treating DKA. Cautious but timely replacement of potassium is vital for avoiding severe cardiac dysrhythmias that occur with hypokalemia.

D

NURSING ALERT

Because a patient's serum potassium level may drop quickly as a result of rehydration and insulin treatment, potassium replacement must begin once potassium levels drop to normal.

Reversing Acidosis

Acidosis of DKA is reversed with insulin, which inhibits the breakdown of fat. Insulin (only regular insulin) is infused at a slow, continuous rate (eg, 5 units per hour). IV fluid solutions with higher concentrations of glucose, such as NS solution (eg, D_5NS, D_5·45NS), are administered when blood glucose levels reach 250 to 300 mg/dL (13.8 to 16.6 mmol/L), to avoid too rapid a drop in the blood glucose level. IV insulin must be infused continuously until subcutaneous administration of insulin can be resumed. However, IV insulin must be continued until the serum bicarbonate level improves and patient can eat.

NURSING PROCESS

The Patient with DKA

Assessment

- Monitor the electrocardiogram (ECG) for dysrhythmias indicating abnormal potassium levels.
- Assess vital signs (especially blood pressure and pulse), arterial blood gases, breath sounds, and mental status every hour and record on a flow sheet.
- Include neurologic status checks as part of the hourly assessment as cerebral edema can be a severe and sometimes fatal outcome.

Diagnosis

Nursing Diagnoses

- Risk for fluid volume deficit related to polyuria and dehydration
- Fluid and electrolyte imbalance related to fluid loss or shifts

- Deficient knowledge about diabetes self-care skills/information
- Anxiety related to loss of control, fear of inability to manage diabetes, misinformation related to diabetes, fear of diabetes complications

Collaborative Problems/Potential Complications

- Fluid overload, pulmonary edema, and heart failure
- Hypokalemia
- Hyperglycemia and ketoacidosis
- Hypoglycemia
- Cerebral edema

Planning and Goals

The major goals for the patient may include maintenance of fluid and electrolyte balance, optimal control of blood glucose levels, ability to perform diabetes survival skills and self-care activities, and absence of complications.

Nursing Interventions

Maintaining Fluid and Electrolyte Balance

- Measure intake and output.
- Administer IV fluids and electrolytes as prescribed; encourage oral fluid intake when permitted.
- Monitor laboratory values of serum electrolytes (especially sodium and potassium).
- Monitor vital signs hourly for signs of dehydration (tachycardia, orthostatic hypotension) along with assessment of breath sounds, level of consciousness, presence of edema, and cardiac status (ECG rhythm strips).

Increasing Knowledge about Diabetes Management

- Carefully asses the patient's understanding of and adherence to the diabetes management plan.
- Explore factors that may have led to the development of DKA with the patient and family.
- If the patient's management differs from those identified in the diabetes management plan, discuss their relationship to the development of DKA, along with early manifestations of DKA.

- If other factors (eg, trauma, illness, surgery, or stress) are implicated, describe appropriate strategies to respond to these and similar situations in the future so the patient can avoid developing life-threatening complications.
- Reteach survival skills to patients who may not be able to recall them.
- If necessary, explore reasons a patient has omitted insulin or oral antidiabetic agents that have been prescribed and address issues to prevent future recurrence and readmissions for treatment of these complications.
- Teach (or remind) the patient about the need for maintaining blood glucose at a normal level and learning about diabetes management and survival skills.

Monitoring and Managing Potential Complications

- Fluid overload: Monitor the patient closely during treatment by measuring vital signs and intake and output at frequent intervals; initiate central venous pressure monitoring and hemodynamic monitoring to provide additional measures of fluid status; focus physical examination on assessment of cardiac rate and rhythm, breath sounds, venous distention, skin turgor, and urine output; monitor fluid intake and keeps careful records of IV and other fluid intake, along with urine output measurements.
- Hypokalemia: Ensure cautious replacement of potassium; however, prior to administration, it is important to ensure that a patient's kidneys are functioning; because of the adverse effects of hypokalemia on cardiac function, monitor cardiac rate, cardiac rhythm, ECG, and serum potassium levels.
- Cerebral edema: Assist with gradual reduction of the blood glucose level; use an hourly flow sheet enable close monitoring of the blood glucose level, serum electrolyte levels, urine output, mental status, and neurologic signs. Take precautions to minimize activities that could increase intracranial pressure.

Teaching Patients Self-Care

- Teach patient survival skills, including treatment modalities (diet, insulin administration, monitoring of blood

glucose, and, for type 1 diabetes, monitoring of urine ketones); recognition, treatment, and prevention of DKA.
- Teaching should also addresses those factors leading to DKA.
- Arrange follow-up education with a home care nurse and dietitian or an outpatient diabetes education center.
- Reinforce the importance of self-monitoring and of monitoring and follow-up by primary health care providers; remind the patient about the importance of keeping follow-up appointments.

Evaluation

Expected Outcomes

- Achieves fluid and electrolyte balance
- Demonstrates knowledge about DKA
- Has absence of complications

For more information, see Chapter 41 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Diarrhea

Diarrhea is a condition defined by an increased frequency of bowel movements (more than three per day), increased amount of stool (more than 200 g per day), and altered consistency (liquid stool). It is usually associated with urgency, perianal discomfort, incontinence, or a combination of these factors. Diarrhea can result from any condition that causes increased intestinal secretions, decreased mucosal absorption, or altered (increased) motility.

Types of diarrhea include secretory, osmotic, malabsorptive, infectious, and exudative. It can be acute (self-limiting and often associated with infection) or chronic (persists for a long period and may return sporadically). It can be caused by certain medications, tube feeding formulas, metabolic and endocrine disorders, and viral and bacterial infections. Other causes are nutritional and malabsorptive disorders, anal sphincter deficit, Zollinger–Ellison syndrome, paralytic ileus,

acquired immunodeficiency syndrome (AIDS), and intestinal obstruction.

Clinical Manifestations

- Increased frequency and fluid content of stool
- Abdominal cramps, distention, intestinal rumbling (borborygmus), anorexia, and thirst
- Painful spasmodic contractions of the anus and ineffectual straining (tenesmus) with each defecation

Other symptoms, depending on the cause and severity and related to dehydration and fluid and electrolyte imbalances, include the following:

- Watery stools, which may indicate small bowel disease
- Loose, semisolid stools, which are associated with disorders of the large bowel
- Voluminous greasy stools, which suggest intestinal malabsorption
- Blood, mucus, and pus in the stools, which denote inflammatory enteritis or colitis
- Oil droplets on the toilet water, which are diagnostic of pancreatic insufficiency
- Nocturnal diarrhea, which may be a manifestation of diabetic neuropathy

Complications

Complications of diarrhea include cardiac dysrhythmias due to fluid and electrolyte (potassium) imbalance, urinary output less than 30 mL/h, muscle weakness, paresthesia, hypotension, anorexia, drowsiness (report if potassium level is less than 3.5 mEq/L [3.5 mmol/L]), skin care issues related to irritant dermatitis, and death if imbalances become severe.

Assessment and Diagnostic Findings

When the cause is not obvious: complete blood cell count; serum chemistries; urinalysis; routine stool examination; and stool examinations for infectious or parasitic organisms, bacterial toxins, blood, fat, electrolytes, and white blood cells. Endoscopy or barium enema may assist in identifying the cause.

Medical Management

- Primary medical management is directed at controlling symptoms, preventing complications, and eliminating or treating the underlying disease.
- Certain medications (eg, antibiotics, anti-inflammatory agents) and antidiarrheals (eg, loperamide [Imodium], diphenoxylate [Lomotil]) may reduce the severity of diarrhea and the disease.
- Increase oral fluids; oral glucose and electrolyte solution may be prescribed.
- Antimicrobials are prescribed when the infectious agent has been identified or diarrhea is severe.
- IV therapy is used for rapid hydration in very young or elderly patients.

Nursing Management

- Elicit a complete health history to identify character and pattern of diarrhea, and the following: any related signs and symptoms, current medication therapy, daily dietary patterns and intake, past related medical and surgical history, and recent exposure to an acute illness or travel to another geographic area.
- Perform a complete physical assessment, paying special attention to auscultation (characteristic bowel sounds), palpation for abdominal tenderness, inspection of stool (obtain a sample for testing).
- Inspect mucous membranes and skin to determine hydration status, and assess perianal area.
- Encourage bed rest, liquids, and foods low in bulk until acute period subsides.
- Recommend bland diet (semisolids to solids) when food intake is tolerated.
- Encourage patient to limit intake of caffeine and carbonated beverages, and avoid very hot and cold foods because these increase intestinal motility.
- Advise patient to restrict intake of milk products, fat, whole grain products, fresh fruits, and vegetables for several days.
- Administer antidiarrheal drugs as prescribed.
- Monitor serum electrolyte levels closely.

- Report evidence of dysrhythmias or change in level of consciousness immediately.
- Encourage patient to follow a perianal skin care routine to decrease irritation and excoriation.

NURSING ALERT

Skin in elderly patients is sensitive to rapid perianal excoriation because of decreased turgor and reduced subcutaneous fat layers.

For more information, see Chapter 38 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Disseminated Intravascular Coagulation

Disseminated intravascular coagulation (DIC) is a potentially life-threatening sign (not a disease itself) of a serious underlying disease mechanism. DIC may be triggered by sepsis, trauma, cancer, shock, abruptio placentae, toxins, or allergic reactions. The severity of DIC is variable, but it is potentially life threatening.

Pathophysiology

In DIC, the normal hemostatic mechanisms are altered so that tiny clots form within the microcirculation of the body. These clots consume platelets and clotting factors, eventually causing coagulation to fail and bleeding to result. This bleeding disorder is characterized by low platelet and fibrinogen levels; prolonged prothrombin time (PT), partial thromboplastin time (PTT), and thrombin time; and elevated fibrin degradation products (D-dimers). The primary prognostic factor is the ability to treat the underlying condition that precipitated DIC.

Clinical Manifestations

Clinical manifestations of DIC are primarily reflected in compromised organ function or failure, usually a result of excessive

clot formation (with resultant ischemia to all or part of the organ) or, less often, bleeding.

- Patient may bleed from mucous membranes, venipuncture sites, and gastrointestinal and urinary tracts.
- Bleeding can range from minimal occult internal bleeding to profuse hemorrhage from all orifices.
- Patients typically develop multiple organ dysfunction syndrome (MODS), and they may exhibit renal failure as well as pulmonary and multifocal central nervous system infarctions as a result of microthromboses, macrothromboses, or hemorrhages.
- Initially, the only manifestation is a progressive decrease in the platelet count; then, progressively, the patient exhibits signs and symptoms of thrombosis in the organs involved. Eventually bleeding occurs (at first subtle, advancing to frank hemorrhage). Signs depend on the organs involved.

Assessment and Diagnostic Findings

- Clinically, the diagnosis of DIC is often established by a drop in platelet count, an increase in PT and activated partial thromboplastin time (aPTT), an elevation in fibrin degradation products, and measurement of one or more clotting factors and inhibitors (eg, antithrombin [AT]).
- The International Society on Thrombosis and Haemostasis has developed a highly sensitive and specific scoring system using the platelet count, fibrin degradation products, PT, and fibrinogen level to diagnose DIC. This system is also useful in predicting the severity of the disease and subsequent mortality.

Medical Management

The most important management issue is treating the underlying cause of DIC. A second goal is to correct the secondary effects of tissue ischemia by improving oxygenation, replacing fluids, correcting electrolyte imbalances, and administering vasopressor medications. If serious hemorrhage occurs, the depleted coagulation factors and platelets may be replaced (cryoprecipitate to replace fibrinogen and factors V and VII; fresh-frozen plasma to replace other coagulation factors).

A heparin infusion, which is a controversial management method, may be used to interrupt the thrombosis process. Other therapies include recombinant activated protein C and AT infusions.

Nursing Management

Maintaining Hemodynamic Status

- Avoid procedures and activities that can increase intracranial pressure, such as coughing and straining.
- Closely monitor vital signs, including neurologic checks, and assess for the amount of external bleeding.
- Avoid medications that interfere with platelet function, if possible (eg, beta-lactam antibiotics, acetylsalicylic acid, nonsteroidal anti-inflammatory drugs).
- Avoid rectal probes and rectal or intramuscular injection medications.
- Use low pressure with any suctioning.
- Administer oral hygiene carefully: use sponge-tipped swabs, salt or soda mouth rinses; avoid lemon-glycerine swabs, hydrogen peroxide, commercial mouthwashes.
- Avoid dislodging any clots, including those around IV sites, injection sites, and so forth.

Maintaining Skin Integrity

- Assess skin, with particular attention to bony prominences and skin folds.
- Reposition carefully; use pressure-reducing mattress and lamb's wool between digits and around ears and soft absorbent material in skin folds, as needed.
- Perform skin care every 2 hours; administer oral hygiene carefully.
- Use prolonged pressure (5 minutes minimum) after essential injections.

Monitoring for Imbalanced Fluid Volume

- Auscultate breath sounds every 2 to 4 hours.
- Monitor extent of edema.
- Monitor volume of IV medications and blood products; decrease volume of IV medications if possible.
- Administer diuretics as prescribed.

Assessing for Ineffective Tissue Perfusion Related to Microthrombi

- Assess neurologic, pulmonary, and skin systems.
- Monitor response to heparin therapy; monitor fibrinogen levels.
- Assess extent of bleeding.
- Stop epsilon-aminocaproic acid if symptoms of thrombosis occur.

Reducing Fear and Anxiety

- Identify previous coping mechanisms, if possible; encourage patient to use them as appropriate.
- Explain all procedures and rationale in terms that the patient and family can understand.
- Assist family in supporting patient.
- Use services from behavioral medicine and clergy, if desired.

For more information, see Chapter 33 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Diverticular Disease

A diverticulum is a saclike herniation of the lining of the bowel that extends through a defect in the muscle layer. Diverticula may occur anywhere in the small intestine or colon but most commonly occur in the sigmoid colon. Diverticulosis exists when multiple diverticula are present without inflammation or symptoms. It is most common in people older than 80 years. A low intake of dietary fiber is considered a major predisposing factor. Diverticulitis results when food and bacteria retained in the diverticulum produce infection and inflammation that can impede draining and lead to perforation or abscess. It may occur in acute attacks or persist as a chronic, smoldering infection. A congenital predisposition is likely when the disorder is present in those younger than 40 years. Complications of diverticulitis include abscess, fistula (abnormal tract) formation, obstruction, perforation, peritonitis, and hemorrhage.

Clinical Manifestations

Diverticulosis

- Frequently, no problematic symptoms are noted; chronic constipation often precedes development.
- Bowel irregularity with intervals of diarrhea, nausea and anorexia, and bloating or abdominal distention.
- Cramps, narrow stools, and increased constipation or at times intestinal obstruction.
- Weakness, fatigue, and anorexia.

Diverticulitis

- Acute onset of mild to severe pain in the left lower quadrant
- Nausea, vomiting, fever, chills, and leukocytosis
- If untreated, peritonitis and septicemia

Assessment and Diagnostic Findings

- Colonoscopy and possibly barium enema studies
- Computed tomography (CT) scan with contrast agent
- Abdominal x-ray
- Laboratory tests: complete blood cell count, revealing an elevated white blood cell count, and elevated erythrocyte sedimentation rate (ESR)

Gerontologic Considerations

The incidence of diverticular disease increases with age because of degeneration and structural changes in the circular muscle layers of the colon and cellular hypertrophy. Symptoms are less pronounced among elderly patients, who may not experience abdominal pain until infection occurs. They may delay reporting symptoms because they fear surgery or cancer. Blood in stool may frequently be overlooked because of failure to examine the stool or inability to see changes because of impaired vision.

Medical Management

Dietary and Pharmacologic Management

- Diverticulitis can usually be treated on an outpatient basis with diet and medication; symptoms treated with rest, analgesics, and antispasmodics.
- The patient is instructed to ingest clear liquids until inflammation subsides, then a high-fiber, low-fat diet. Antibiotics

are prescribed for 7 to 10 days and a bulk-forming laxative is also prescribed.
- Patients with significant symptoms and often those who are elderly, immunocompromised, or taking corticosteroids are hospitalized. The bowel is rested by withholding oral intake, administering IV fluids, and instituting nasogastric suctioning.
- Broad-spectrum antibiotics and analgesics are prescribed and an opioid is prescribed for pain relief. Oral intake is increased as symptoms subside. A low-fiber diet may be necessary until signs of infection decrease.
- Antispasmodics such as propantheline bromide and oxyphencyclimine (Daricon) may be prescribed.
- Normal stools can be achieved by administering bulk preparations (psyllium), stool softeners, warm oil enemas, and evacuant suppositories.

Surgical Management

Surgery (resection) is usually necessary only if complications (eg, perforation, peritonitis, hemorrhage, obstruction) occur. Type of surgery performed varies according to the extent of complications (one-stage resections or multistaged procedures). In some cases fecal diversion (colostomy) may be performed.

NURSING PROCESS

The Patient with Diverticulitis

Assessment

- Assess health history, including onset and duration of pain, dietary habits (fiber intake), and past and present elimination patterns (straining at stool, constipation with diarrhea, tenesmus [spasm of the anal sphincter with pain and persistent urge to defecate], abdominal bloating, and distention).
- Auscultate for presence and character of bowel sounds; palpate for tenderness, pain, or firm mass over left lower quadrant; inspect stool for pus, mucus, or blood.
- Monitor blood pressure, temperature, and pulse for abnormal variations.

Diagnosis

Nursing Diagnoses

- Constipation related to narrowing of the colon secondary to thickened muscular segments and strictures
- Acute pain related to inflammation and infection

Collaborative Problems/Potential Complications

- Peritonitis
- Abscess formation
- Bleeding

Planning and Goals

The major goals of the patient may include attainment and maintenance of normal elimination patterns, pain relief, and absence of complications.

Nursing Interventions

Maintaining Normal Elimination Patterns

- Increase fluid intake to 2 L/day within limits of patient's cardiac and renal reserve.
- Promote foods that are soft but have increased fiber content.
- Encourage individualized exercise program to improve abdominal muscle tone.
- Review patient's routine to establish a set time for meals and defecation.
- Encourage daily intake of bulk laxatives (eg, psyllium [Metamucil], stool softeners, or oil-retention enemas).
- Administer stool softeners or oil retention enemas as prescribed.
- Urge patients to identify food triggers (eg, nuts and popcorn) that may bring on an attack of diverticulitis and avoid them.

Relieving Pain

- Administer analgesic agents (usually opioid analgesics) for pain and antispasmodic medications.
- Record and monitor intensity, duration, and location of pain.

Monitoring and Managing Potential Complications

- Identify patients at risk and manage their symptoms as needed.

- Assess for indicators of perforation: increased abdominal pain and tenderness accompanied by abdominal rigidity, elevated white blood cell count, elevated ESR, increased temperature, tachycardia, and hypotension.
- Perforation is a surgical emergency: monitor vital signs and urine output, and administer IV fluids as prescribed.

Evaluation

Expected Patient Outcomes

- Attains a normal pattern of elimination
- Reports decreased pain
- Recovers without complications

For more information, see Chapter 38 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.



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Emphysema, Pulmonary

In emphysema, impaired oxygen and carbon dioxide exchange results from destruction of the walls of overdistended alveoli. "Emphysema" is a pathologic term that describes an abnormal distention of the air spaces beyond the terminal bronchioles and destruction of the walls of the alveoli. This is the end stage of a process that progresses slowly for many years. As the walls of the alveoli are destroyed (a process accelerated by recurrent infections), the alveolar surface area in direct contact with the pulmonary capillaries continually decreases. This causes an increase in dead space (lung area where no gas exchange can occur) and impaired oxygen diffusion, which leads to hypoxemia. In the later stages of disease, carbon dioxide elimination is impaired, resulting in increased carbon dioxide tension in arterial blood (hypercapnia) leading to respiratory acidosis. As the alveolar walls continue to break down, the pulmonary capillary bed is reduced in size. Consequently, resistance to pulmonary blood flow is increased, forcing the right ventricle to maintain a higher blood pressure in the pulmonary artery. Hypoxemia may further increase pulmonary artery pressures. For this reason, right-sided heart failure (cor pulmonale) is one of the complications of emphysema. Congestion, dependent edema, distended neck veins, or pain in the region of the liver suggests the development of cardiac failure.

There are two main types of emphysema, based on the changes taking place in the lung. Both types may occur in the same patient. In the panlobular (panacinar) type of emphysema, there is destruction of the respiratory bronchiole, alveolar duct, and alveolus. All air spaces within the lobule are essentially enlarged, but there is little inflammatory disease. A hyperinflated (hyperexpanded) chest, marked dyspnea on exertion, and weight loss typically occur. To move air into and out of the lungs, negative pressure is required during

inspiration, and an adequate level of positive pressure must be attained and maintained during expiration. Instead of being an involuntary passive act, expiration becomes active and requires muscular effort.

In the centrilobular (centroacinar) form, pathologic changes take place mainly in the center of the secondary lobule, preserving the peripheral portions of the acinus. Frequently, there is a derangement of ventilation–perfusion ratios, producing chronic hypoxemia, hypercapnia, polycythemia, and episodes of right-sided heart failure. This leads to central cyanosis and respiratory failure. The patient also develops peripheral edema, which is treated with diuretic therapy.

Nursing Management

See “Nursing Management” under “Chronic Obstructive Pulmonary Disease” for additional information.

Empyema

Empyema is a collection of thick, purulent (infected) fluid within the pleural space. At first the pleural fluid is thin, with a low leukocyte count, but it frequently progresses to a fibropurulent stage and then to a stage at which it encloses the lung with a thick exudative membrane (loculated empyema).

Clinical Manifestations

- Patient is acutely ill with signs and symptoms similar to those of an acute respiratory infection or pneumonia (fever, night sweats, pleural pain, cough, dyspnea, anorexia, weight loss).
- Symptoms may be vague if the patient is immunocompromised; symptoms may be less obvious if patient has received antimicrobial therapy.

Assessment and Diagnostic Methods

- Chest auscultation, which demonstrates decreased or absent breath sounds over the affected area; dullness on chest percussion; decreased fremitus
- Chest computed tomography (CT) and thoracentesis (under ultrasound guidance)

Medical Management

The objectives of treatment are to drain the pleural cavity and to achieve complete expansion of the lung. The fluid is drained, and appropriate antibiotics, in large doses, are prescribed on the basis of the causative organism. Drainage of the pleural fluid depends on the stage of the disease and is accomplished by one of the following methods:

- Needle aspiration (thoracentesis) if volume is small and fluid is not too thick.
- Tube thoracostomy with fibrinolytic agents instilled through chest tube when indicated.
- Open chest drainage via thoracotomy to remove thickened pleura, pus, and debris and to remove the underlying diseased pulmonary tissue.
- Decortication, surgical removal, if inflammation has been long standing.

Nursing Management

- Provide care specific to method of drainage of pleural fluid.
- Help patient cope with condition; instruct in lung expansion breathing exercises to restore normal respiratory function.
- Instruct patient and family about care of drainage system and drain site and measurement and observation of drainage.
- Teach patient and family signs and symptoms of infection and how and when to contact the health care provider.

For more information, see Chapter 23 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Endocarditis, Infective

Infective endocarditis is a microbial infection of the endothelial surface of the heart. A deformity or injury of the endocardium leads to accumulation on the endocardium of fibrin and platelets (clot formation). Infectious organisms, usually staphylococci, streptococci, enterococci, pneumococci, or chlamydiae

invade the clot and endocardial lesion. Other causative microorganisms include fungi (eg, *Candida*, *Aspergillus*) and rickettsiae

Risk Factors

- Prosthetic heart valves or structural cardiac defects (eg, valve disorders, hypertrophic cardiomyopathy [HCM]).
- Age: More common in older people, who are more likely to have degenerative or calcific valve lesions, reduced immunologic response to infection, and the metabolic alterations associated with aging.
- Intravenous (IV) drug use: There is a high incidence of staphylococcal endocarditis among IV drug users.
- Hospitalization: Hospital-acquired endocarditis occurs most often in patients with debilitating disease or indwelling catheters and in those receiving hemodialysis or prolonged IV fluid or antibiotic therapy.
- Immunosuppression: Patients taking immunosuppressive medications or corticosteroids are more susceptible to fungal endocarditis.

Clinical Manifestations

- Primary presenting symptoms are fever and a heart murmur: Fever may be intermittent or absent, especially in elderly patients, patients receiving antibiotics or corticosteroids, or those who have heart failure or renal failure.
- Vague complaints of malaise, anorexia, weight loss, cough, and back and joint pain.
- A heart murmur may be absent initially but develops in almost all patients.
- Small, painful nodules (Osler nodes) may be present in the pads of fingers or toes.
- Irregular, red or purple, painless, flat macules (Janeway lesions) may be present on the palms, fingers, hands, soles, and toes.
- Hemorrhages with pale centers (Roth spots) caused by emboli may be observed in the fundi of the eyes. Splinter hemorrhages (ie, reddish brown lines and streaks) may be seen under the fingernails and toenails.
- Petechiae may appear in the conjunctiva and mucous membranes.

- Cardiomegaly, heart failure, tachycardia, or splenomegaly may occur.
- Central nervous system manifestations include headache, temporary or transient cerebral ischemia, and strokes.
- Embolization may be a presenting symptom, and it may occur at any time and may involve other organ systems; embolic phenomena may occur.

Assessment and Diagnostic Methods

A diagnosis of acute infective endocarditis is made when the onset of infection and resulting valvular destruction are rapid, occurring within days to weeks.

- Blood cultures
- Doppler or transesophageal echocardiography

Complications

Complications include heart failure, cerebral vascular complications, valve stenosis or regurgitation, myocardial damage, and mycotic aneurysms.

Medical Management

Objectives of treatment are to eradicate the invading organism through adequate doses of an appropriate antimicrobial agent (continuous IV infusion for 2 to 6 weeks at home). Treatment measures include the following:

- Isolating causative organism through serial blood cultures. Blood cultures are taken to monitor the course of therapy.
- Monitoring patient's temperature for effectiveness of the treatment.
- After recovery from the infectious process, seriously damaged valves may require debridement or replacement. For example, surgical valve replacement is required if heart failure develops, if patient has more than one serious systemic embolic episode, if infection cannot be controlled or is recurrent, or if infection is caused by a fungus.

Nursing Management

- Provide psychosocial support while patient is confined to hospital or home with restrictive IV therapy.

- Monitor patient's temperature; a fever may be present for weeks.
- Assess heart sounds for new or worsening murmur.
- Monitor for signs and symptoms of systemic embolization, or, for patients with right heart endocarditis, signs and symptoms of pulmonary infarction and infiltrates.
- Assess for signs and symptoms of organ damage such as stroke (cerebrovascular accident [CVA], brain attack), meningitis, heart failure, myocardial infarction, glomerulonephritis, and splenomegaly.
- Instruct patient and family about activity restrictions, medications, and signs and symptoms of infection.
- Reinforce that antibiotic prophylaxis is recommended for patients who have had infective endocarditis and who are undergoing invasive procedures.
- If patient received surgical treatment, provide postsurgical care and instruction.
- Refer to home care nurse to supervise and monitor IV antibiotic therapy in the home. For additional nursing interventions, see "Preoperative and Postoperative Nursing Management" in Chapter P.

For more information, see Chapter 29 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's Textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Endocarditis, Rheumatic

Acute rheumatic fever, which occurs most often in school-age children, may develop after an episode of group a beta-hemolytic streptococcal pharyngitis. Patients with rheumatic fever may develop rheumatic heart disease as evidenced by a new heart murmur, cardiomegaly, pericarditis, and heart failure. Prompt treatment of "strep" throat with antibiotics can prevent the development of rheumatic fever. The *Streptococcus* is spread by direct contact with oral or respiratory secretions. Although the bacteria are the causative agents, malnutrition, overcrowding, poor hygiene, and lower socioeconomic status may predispose individuals to rheumatic fever. The incidence of rheumatic

fever in the United States and other developed countries has generally decreased, but the exact incidence is difficult to determine because the infection may go unrecognized, and people may not seek treatment. Clinical diagnostic criteria are not standardized, and autopsies are not routinely performed. Further information about rheumatic fever and rheumatic endocarditis can be found in pediatric nursing books.

For more information, see Chapter 29 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Endometriosis

Endometriosis is a benign lesion with cells similar to those lining the uterus, growing aberrantly in the pelvic cavity outside the uterus. During menstruation, this ectopic tissue bleeds, mostly into areas having no outlet, which causes pain and adhesions. Endometrial tissue can also be spread by lymphatic or venous channels. There is a high incidence among patients who bear children later and have fewer children. It is usually found in nulliparous women between 25 and 35 years of age and in adolescents, particularly those with dysmenorrhea that does not respond to nonsteroidal anti-inflammatory drugs (NSAIDs) or oral contraceptives. There appears to be a familial predisposition to endometriosis. It is a major cause of chronic pelvic pain and infertility.

Clinical Manifestations

- Symptoms vary but include dysmenorrhea, dyspareunia, and pelvic discomfort or pain (some patients have no pain).
- Dyschezia (pain with bowel movements) and radiation of pain to the back or leg may occur.
- Depression, inability to work due to pain, and difficulties in personal relationship may result.
- Infertility may occur.

Assessment and Diagnostic Methods

A health history, including an account of the menstrual pattern, is necessary to elicit specific symptoms. On bimanual

pelvic examination, fixed tender nodules are sometimes palpated, and uterine mobility may be limited, indicating adhesions. Laparoscopic examination confirms the diagnosis and enables clinicians to determine the disease's stage.

Medical Management

Treatment depends on symptoms, desire for pregnancy, and extent of the disease. In asymptomatic cases, routine examination may be all that is required. Other therapy for varying degrees of symptoms may be NSAIDs, oral contraceptives, gonadotropin-releasing hormone (GnRH) agonists, or surgery. Pregnancy often alleviates symptoms because neither ovulation nor menstruation occurs.

Pharmacologic Therapy

- Palliative measures (eg, use of medications, such as analgesic agents and prostaglandin inhibitors) for pain.
- Oral contraceptives.
- Synthetic androgen, danazol (Danocrine), causes atrophy of the endometrium and subsequent amenorrhea. (Danazol is expensive and may cause troublesome side effects such as fatigue, depression, weight gain, oily skin, decreased breast size, mild acne, hot flashes, and vaginal atrophy.)
- GnRH agonists decrease estrogen production and cause subsequent amenorrhea. Side effects are related to low estrogen levels (eg, hot flashes and vaginal dryness).

Surgical Management

- Laparoscopy to fulgurate endometrial implants and to release adhesions.
- Laser surgery to vaporize or coagulate endometrial implants, thereby destroying the tissue.
- Other surgical procedures may include endocoagulation and electrocoagulation, laparotomy, abdominal hysterectomy, oophorectomy, bilateral salpingo-oophorectomy, and appendectomy. Hysterectomy may be an option for some women.

Nursing Management

- Obtain health history and physical examination report, concentrating on identifying when and how long specific

symptoms have been bothersome, the effect of prescribed medications, and the woman's reproductive plans.
- Explain various diagnostic procedures to alleviate anxiety.
- Provide emotional support to the woman and her partner who wish to have children.
- Respect and address psychosocial impact of realization that pregnancy is not easily possible. Discuss alternatives, such as in vitro fertilization (IVF) or adoption.
- Encourage patient to seek care of dysmenorrhea or abnormal bleeding patterns.
- Direct patient to the Endometriosis Association for more information and support.

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For more information, see Chapter 47 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Epididymitis

Epididymitis is an infection of the epididymis, which usually spreads from an infected urethra, bladder, or prostate. In prepubertal males, older men, and homosexual men, the predominant causal organism is *Escherichia coli*, although in older men, the condition may also be a result of urinary obstruction. In sexually active men aged 35 years and younger, the pathogens are usually related to bacteria associated with sexually transmitted diseases (STDs) (eg, *Chlamydia trachomatis*, *Neisseria gonorrhoeae*).

Clinical Manifestations

- Often slowly develops over 1 to 2 days, beginning with a low-grade fever, chills, and heaviness in the affected testicle.
- Unilateral pain and soreness in the inguinal canal along the course of the vas deferens.
- Pain and swelling in the scrotum and groin.
- There may be discharge from the urethra, blood in the semen, pus (pyuria) and bacteria (bacteriuria) in the urine, and pain during intercourse and ejaculation.

- Urinary frequency, urgency, or dysuria, and testicular pain aggravated by bowel movement.

Medical Management

- If epididymitis is associated with an STD, the patient's partner should also receive antimicrobial therapy.
- If seen within first 24 hours after onset of pain, patient's spermatic cord may be infiltrated with a local anesthetic agent for relief.
- Supportive interventions include reduction in physical activity, scrotal support and elevation, ice packs, anti-inflammatory agents, analgesics, including nerve blocks, and sitz baths.
- Observe for abscess formation.
- Epididymectomy (excision of the epididymis from the testes) may be performed for patients who have recurrent, refractory, incapacitating episodes of this infection.

Nursing Management

- Place patient on bed rest with scrotum elevated with a scrotal bridge or folded towel to prevent traction on spermatic cord, to improve venous drainage, and to relieve pain.
- Give antimicrobial medications as prescribed.
- Provide intermittent cold compresses to scrotum to help ease pain; later, local heat or sitz baths may hasten resolution of inflammatory process.
- Give analgesic agents as prescribed for pain relief.
- Instruct patient to avoid straining, lifting, and sexual stimulation until infection is under control.
- Instruct patient to continue with analgesic and antibiotic medications as prescribed and to use ice packs as necessary for discomfort.
- Explain that it may take 4 weeks or longer for the epididymis to return to normal.

For more information, see Chapter 49 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Epilepsies

The epilepsies are a symptom complex of several disorders of brain function characterized by recurring seizures. There may be associated loss of consciousness, excess movement, or loss of muscle tone or movement and disturbances of behavior, mood, sensation, and perception. The basic problem is an electrical disturbance (dysrhythmia) in the nerve cells in one section of the brain, causing them to emit abnormal, recurring, uncontrolled electrical discharges. The characteristic epileptic seizure is a manifestation of this excessive neuronal discharge. In most cases, the cause is unknown (idiopathic). Susceptibility to some types may be inherited. Epilepsies often follow many medical disorders, traumas, and drug or alcohol intoxication. They are also associated with brain tumors, abscesses, and congenital malformations. Epilepsy affects an estimated 3% of people during their lifetime, and most forms of epilepsy occur in childhood. Epilepsy is not synonymous with mental retardation or illness; it is not associated with intellectual level.

Clinical Manifestations

Seizures range from simple staring episodes to prolonged convulsive movements with loss of consciousness. Seizures are classified as partial, generalized, and unclassified according to the area of brain involved. Aura, a premonitory or warning sensation, may occur before a seizure (eg, seeing a flashing light, hearing a sound).

Simple Partial Seizures

Only a finger or hand may shake; the mouth may jerk uncontrollably; the patient may talk unintelligibly, may be dizzy, or may experience unusual or unpleasant sights, sounds, odors, or taste—all without loss of consciousness.

Complex Partial Seizures

The patient remains motionless or moves automatically but inappropriately for time and place; may experience excessive emotions of fear, anger, elation, or irritability; and does not remember episode when it is over.

Generalized Seizures (Grand Mal Seizures)

Generalized seizures involve both hemispheres of the brain. There is intense rigidity of the entire body, followed by alternations of muscle relaxation and contraction (generalized tonic–clonic contraction).

- Simultaneous contractions of diaphragm and chest muscles produce characteristic epileptic cry.
- Tongue is chewed; patient is incontinent of urine and stool.
- Convulsive movements last 1 or 2 minutes.
- The patient then relaxes and lies in a deep coma, breathing noisily.

Postictal State

After the seizure, patients are often confused and hard to arouse and may sleep for hours. Many complain of headache, sore muscles, fatigue, and depression.

Assessment and Diagnostic Methods

- Developmental history and physical and neurologic examinations are done to determine the type, frequency, and severity of seizures. Biochemical, hematologic, and serologic studies are included.
- Magnetic resonance imaging (MRI) is performed to detect structural lesions such as focal abnormalities, cerebrovascular abnormalities, and cerebral degenerative changes.
- Electroencephalograms (EEGs) aid in classifying the type of seizure.
- Single photon emission CT (SPECT) may be used to identify the epileptogenic zone.

Medical Management

The management of epilepsy and status epilepticus is planned according to immediate and long-range needs and is tailored to meet the patient's needs because some cases arise from brain damage and others are due to altered brain chemistry. The goals of treatment are to stop the seizures as quickly as possible, to ensure adequate cerebral oxygenation, and to maintain a seizure-free state.

An airway and adequate oxygenation (intubate if necessary) are established, as is an IV line for administering medications and obtaining blood samples for analysis.

Pharmacologic Therapy

Medications are used to achieve seizure control. The usual treatment is single-drug therapy.

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- IV diazepam, lorazepam, or fosphenytoin is administered slowly in an attempt to halt the seizures. General anesthesia with a short-acting barbiturate may be used if initial treatment is unsuccessful.
- To maintain a seizure-free state, other medications (phenytoin, phenobarbital) are prescribed after the initial seizure is treated.

Surgical Management

- Surgery is indicated when epilepsy results from intracranial tumors, abscesses, cysts, or vascular anomalies.
- Surgical removal of the epileptogenic focus is done for seizures that originate in a well-circumscribed area of the brain that can be excised without producing significant neurologic defects.

NURSING PROCESS

The Patient with Epilepsy

Assessment

- Obtain a complete seizure history. Ask about factors or events that precipitate the seizures; document alcohol intake.
- Determine whether the patient has an aura before an epileptic seizure, which may indicate the origin of the seizure (eg, seeing a flashing light may indicate that the seizure originated in the occipital lobe).
- Observe and assess neurologic condition during and after a seizure. Assess vital and neurologic signs continuously. Patient may die from cardiac involvement or respiratory depression.
- Assess effects of epilepsy on lifestyle.

Diagnosis

Nursing Diagnoses

- Risk for injury related to seizure activity
- Fear related to possibility of having seizures

BOX E-1 Status Epilepticus

Status epilepticus (acute prolonged seizure activity) is a series of generalized seizures that occur without full recovery of consciousness between attacks. The condition is a medical emergency that is characterized by continuous clinical or electrical seizures lasting at least 30 minutes. Repeated episodes of cerebral anoxia and edema may lead to irreversible and fatal brain damage. Common factors that precipitate status epilepticus include withdrawal of antiseizure medication, fever, and concurrent infection.

- Ineffective coping related to stresses imposed by epilepsy
- Deficient knowledge about epilepsy and its control

Collaborative Problems/Potential Complications

Status epilepticus (see Box E-1) and toxicity related to medications

Planning and Goals

Major goals include prevention of injury, control of seizures, achievement of a satisfactory psychosocial adjustment, acquisition of knowledge and understanding about the condition, and absence of complications.

Nursing Interventions

General Care and Injury Prevention

- Perform periodic physical examinations and laboratory tests for patients taking medications known to have toxic hematopoietic, genitourinary, or hepatic effects.
- Provide ongoing assessment and monitoring of respiratory and cardiac function.
- Monitor the seizure type and general condition of patient.
- Turn patient to side-lying position to assist in draining pharyngeal secretions.
- Have suction equipment available if patient aspirates.
- Monitor IV line closely for dislodgment during seizures.
- Protect patient from injury during seizures with padded side rails, and keep under constant observation.

- Do not restrain patient's movements during seizure activity. Do not insert anything in patient's mouth.

Reducing Fear of Seizures

- Reduce fear that a seizure may occur unexpectedly by encouraging compliance with prescribed treatment.
- Emphasize that prescribed antiepileptic medication must be taken on a continuing basis and is not habit forming.
- Assess lifestyle and environment to determine factors that precipitate seizures, such as emotional disturbances, environmental stressors, onset of menstruation, or fever. Encourage patient to avoid such stimuli.
- Encourage patient to follow a regular and moderate routine in lifestyle, diet (avoiding excessive stimulants), exercise, and rest (regular sleep patterns).
- Advise patient to avoid photic stimulation (eg, bright flickering lights, television viewing); dark glasses or covering one eye may help.
- Encourage patient to attend classes on stress management.

Improving Coping Mechanisms

- Understand that epilepsy imposes feelings of stigmatization, alienation, depression, and uncertainty.
- Provide counseling to patient and family to help them understand the condition and limitations imposed.
- Encourage patient to participate in social and recreational activities.
- Teach patient and family about symptoms and their management.

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE

- Prevent or control gingival hyperplasia, a side effect of phenytoin (Dilantin) therapy, by teaching patient to perform thorough oral hygiene and gum massage and seek regular dental care.
- Instruct patient to notify physician if unable to take medications due to illness.
- Instruct patient and family about medication side effects and toxicity.

- Provide specific guidelines to assess and report signs and symptoms of medication overdose.
- Teach patient to keep a drug and seizure chart, noting when medications are taken and any seizure activity.
- Instruct patient to take showers rather than tub baths to avoid drowning and to never swim alone.
- Encourage realistic attitude toward the disease; provide facts concerning epilepsy.
- Instruct patient to carry an emergency medical identification card or wear an identification bracelet.
- Advise patient to seek preconception and genetic counseling if desired (inherited transmission of epilepsy has not been proved).

CONTINUING CARE

- Financial considerations: Epilepsy Foundation of America offers a mail-order program for medications at minimum cost and access to life insurance as well as information on vocational rehabilitation and coping with epilepsy.
- Vocational rehabilitation: The state Vocational Rehabilitation Agency, Epilepsy Foundation of America, and federal and state agencies may be of assistance in cases of job discrimination.

Evaluation

Expected Patient Outcomes

- Sustains no injuries from seizure activity
- Indicates a decrease in fear
- Displays effective individual coping
- Exhibits knowledge and understanding of epilepsy
- Experiences no complications of seizures (injury) or complications of status epilepticus

For more information, see Chapter 61 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Epistaxis (Nosebleed)

Epistaxis is a hemorrhage from the nose caused by the rupture of tiny, distended vessels in the mucous membrane of any area of the nasal passage. The anterior septum is the most common site. Risk factors include infections, low humidity, nasal inhalation of illicit drugs, trauma (including vigorous nose blowing and nose picking), arteriosclerosis, hypertension, nasal tumors, thrombocytopenia, aspirin use, liver disease, and hemorrhagic syndromes.

Medical Management

A nasal speculum, penlight, or headlight may be used to identify the site of bleeding in the nasal cavity. The patient sits upright with the head tilted forward to prevent swallowing and aspiration of blood and is directed to pinch the soft outer portion of the nose against the midline septum for 5 or 10 minutes continuously. Alternatively, a cotton tampon may be used to try to stop the bleeding. Suction may be used to remove excess blood and clots from the field of inspection. Application of anesthetics and nasal decongestants (phenylephrine, one or two sprays) to act as vasoconstrictors may be necessary. Visible bleeding sites may be cauterized with silver nitrate or electrocautery (high-frequency electrical current).

If the origin of the bleeding cannot be identified, the nose may be packed with gauze impregnated with petrolatum jelly or antibiotic ointment. The packing may remain in place for 48 hours or up to 5 or 6 days if necessary to control bleeding. Antibiotics may be prescribed to prevent and manage infection.

Nursing Management

- Monitor vital signs, airway, and breathing, and assist in control of bleeding.
- Provide tissues and an emesis basin for expectoration of blood.
- Reassure patient in a calm, efficient manner that bleeding can be controlled.
- Once bleeding is controlled, instruct the patient to avoid vigorous exercise for several days and to avoid hot or spicy foods and tobacco.

- Teach patient to provide self-care by reviewing ways to prevent epistaxis: avoid forceful nose blowing, straining, high altitudes, and nasal trauma (including nose picking).
- Provide adequate humidification to prevent drying of nasal passages.
- Instruct patient how to apply direct pressure to nose with thumb and index finger for 15 minutes if nosebleed recurs.
- Instruct patient to seek medical attention if recurrent bleeding cannot be stopped.

For more information, see Chapter 22 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Esophageal Varices, Bleeding

Bleeding or hemorrhage from esophageal varices is one of the major causes of death in patients with cirrhosis. Esophageal varices are dilated tortuous veins usually found in the submucosa of the lower esophagus; they may develop higher in the esophagus or extend into the stomach. The condition is nearly always caused by portal hypertension. Risk factors for hemorrhage include muscular strain from heavy lifting; straining at stool; sneezing, coughing, or vomiting; esophagitis or irritation of vessels (rough food or irritating fluids); reflux of stomach contents (especially alcohol); and salicylates or any drug that erodes the esophageal mucosa.

Clinical Manifestations

- Hematemesis, melena, or general deterioration in mental or physical status; often a history of alcohol abuse.
- Signs and symptoms of shock (cool clammy skin, hypotension, tachycardia) may be present.

NURSING ALERT

Bleeding esophageal varices can quickly lead to hemorrhagic shock and should be considered an emergency.

Assessment and Diagnostic Methods

- Endoscopy, barium swallow, ultrasonography, CT, and angiography
- Neurologic and portal hypertension assessment
- Liver function tests (serum aminotransferases, bilirubin, alkaline phosphatase, and serum proteins)
- Splenoportography, hepatoportography, and celiac angiography

NURSING ALERT

Provide support before and during examination by endoscopy to relieve stress. Monitor carefully to detect early signs of cardiac dysrhythmias, perforation, and hemorrhage. Do not allow the patient to drink fluids after the examination until the gag reflex returns. Offer lozenges and gargles to relieve throat discomfort, but withhold any oral intake if patient is actively bleeding. Provide support and explanations regarding care and procedures.

Medical Management

- Aggressive medical care includes evaluation of extent of bleeding and continuous monitoring of vital signs when hematemesis and melena are present.
- Signs of potential hypovolemia are noted; blood volume is monitored with a central venous catheter or pulmonary artery catheter.
- Oxygen is administered to prevent hypoxia and to maintain adequate blood oxygenation, and IV fluids and volume expanders are administered to restore fluid volume and replace electrolytes.
- Transfusion of blood components may also be required.

Nonsurgical treatment is preferred because of the high mortality associated with emergency surgery to control bleeding from esophageal varices and because of the poor physical condition of most of these patients. Nonsurgical measures include:

- Pharmacologic therapy: vasopressin (Pitressin), vasopressin with nitroglycerin, somatostatin and octreotide (Sandostatin), beta-blocking agents, and nitrates

- Balloon tamponade, saline lavage, and endoscopic sclerotherapy
- Esophageal banding therapy and variceal band ligation
- Transjugular intrahepatic portosystemic shunting (TIPS)

Surgical Management

If necessary, surgery may involve the following:

- Direct surgical ligation of varices
- Splenorenal, mesocaval, and portacaval venous shunts
- Esophageal transection with devascularization.

Nursing Management

Provide postoperative care similar to that for any thoracic or abdominal operation. See "Preoperative and Postoperative Nursing Management" for additional information.

NURSING ALERT

The risk for postsurgical complications (hypovolemic or hemorrhagic shock, hepatic encephalopathy, electrolyte imbalance, metabolic and respiratory alkalosis, alcohol withdrawal syndrome, and seizures) is high. In addition, bleeding may recur as new collateral vessels develop.

- Monitor patient's physical condition and evaluate emotional responses and cognitive status.
- Monitor and record vital signs. Assess nutritional status.
- Perform a neurologic assessment, monitoring for signs of hepatic encephalopathy (findings may range from drowsiness to encephalopathy and coma).
- Treat bleeding by complete rest of the esophagus. Initiate parenteral nutrition (PN) as ordered.
- Assist patient to avoid straining and vomiting. Maintain gastric suction to keep the stomach as empty as possible.
- Provide frequent oral hygiene and moist sponges to the lips to relieve thirst.
- Closely monitor blood pressure.
- Provide vitamin K therapy and multiple blood transfusions as ordered for blood loss.

- Provide a quiet environment and calm reassurance to reduce anxiety and agitation. Provide emotional support and pertinent explanations regarding medical and nursing interventions.
- Monitor closely to detect and manage complications, including hypovolemic or hemorrhagic shock, hepatic encephalopathy, electrolyte imbalance, metabolic and respiratory alkalosis, alcohol withdrawal syndrome, and seizures.

For more information, see Chapter 39 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Exfoliative Dermatitis

Exfoliative dermatitis is a serious condition characterized by progressive inflammation in which erythema and scaling occur. This condition starts acutely as either a patchy or a generalized erythematous eruption. Exfoliative dermatitis has a variety of causes. It is considered to be a secondary or reactive process to an underlying skin or systemic disease. It may appear as a part of the lymphoma group of diseases and may precede the appearance of lymphoma. Preexisting skin disorders implicated as a cause include psoriasis, atopic dermatitis, and contact dermatitis. It also appears as a severe medication reaction to penicillin and phenylbutazone. The cause is unknown in about 25% of cases.

Clinical Manifestations

- Chills, fever, malaise, prostration, severe toxicity, a pruritic scaling of the skin, and occasionally gastrointestinal symptoms.
- Profound loss of stratum corneum (outermost layer of the skin), causing capillary leakage, hypoproteinemia, and negative nitrogen balance.
- Widespread dilation of cutaneous vessels, resulting in large amounts of body heat loss.
- Skin color changes from pink to dark red; after a week, exfoliation (scaling) begins in the form of thin flakes that leave the underlying skin smooth and red, with new scales forming as the older ones come off.
- Possible hair loss.
- Relapse common.

- Systemic effects: high-output heart failure, other gastrointestinal disturbances, breast enlargement, hyperuricemia, temperature disturbances.

Medical Management

Goals of management are to maintain fluid and electrolyte balance and to prevent infection. Treatment is individualized and supportive and is started as soon as condition is diagnosed.

- Hospitalize patient and place on bed rest.
- Discontinue all medications that may be implicated.
- Maintain comfortable room temperature because of patient's abnormal thermoregulatory control.
- Maintain fluid and electrolyte balance because of considerable water and protein loss from skin surface.
- Give plasma expanders as indicated.

NURSING ALERT

Observe for signs and symptoms of high-output heart failure due to hyperemia and increased blood flow.

Nursing Management

- Carry out continual nursing assessment to detect infection.
- Administer prescribed antibiotics on the basis of culture and sensitivity test results.
- Assess for hypothermia because of increased skin blood flow coupled with increased heat and water loss through the skin.
- Closely monitor and report changes in vital signs.
- Use topical therapy for symptomatic relief.
- Recommend soothing baths, compresses, and lubrication with emollients to treat extensive dermatitis.
- Administer prescribed oral or parenteral corticosteroids when disease is not controlled by more conservative therapy.
- Advise patient to avoid all irritants, particularly medications.

For more information, see Chapter 56 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.



F

Fractures

A fracture is a complete or incomplete disruption in the continuity of bone structure and is defined according to its type and extent. Fractures occur when the bone is subjected to stress greater than it can absorb. Fractures can be caused by a direct blow, crushing force, sudden twisting motion, or even extreme muscle contractions. When the bone is broken, adjacent structures are also affected, resulting in soft tissue edema, hemorrhage into the muscles and joints, joint dislocations, ruptured tendons, severed nerves, and damaged blood vessels. Body organs may be injured by the force that caused the fracture or by the fracture fragments.

Types of Fractures

- Complete fracture: a break across the entire cross section of the bone, which is frequently displaced.
- Incomplete fracture, also called greenstick fracture: Break occurs only through part of the cross section of the bone.
- Comminuted fractures: a break with several bone fragments.
- Closed fracture, or simple fracture: does not produce a break in the skin.
- Open fracture, or compound or complex fracture: a break in which the skin or mucous membrane wound extends to the fractured bone. Open fractures are graded as follows: grade I: a clean wound less than 1 cm long; grade II: a larger wound without extensive soft tissue damage; grade III: wound is highly contaminated and has extensive soft tissue damage (most severe type).
- Fractures may also be described according to anatomic placement of fragments, particularly if they are displaced or nondisplaced.
- An intra-articular fracture extends into the joint surface of a bone.

Early complications include shock, fat embolism, compartment syndrome, and venous thromboemboli (deep vein thrombosis [DVT], pulmonary embolism [PE]). Delayed complications include delayed union, malunion, nonunion, avascular necrosis (AVN) of bone, reaction to internal fixation devices, complex regional pain syndrome (CRPS, formerly called reflex sympathetic dystrophy [RSD]), and heterotopic ossification.

Clinical Manifestations

The clinical signs and symptoms of a fracture include acute pain, loss of function, deformity, shortening of the extremity, crepitus, and localized edema and ecchymosis. Not all of these are present in every fracture.

Manifestations of Complications

- If fat embolism syndrome occurs, with blockage of the small blood vessels that supply the brain, lungs, kidneys, and other organs (sudden onset, usually occurring within 12 to 48 hours but may occur up to 10 days after injury), the following may be noted: hypoxia, tachypnea, tachycardia, and pyrexia; dyspnea, crackles, wheezes, precordial chest pain, cough, large amounts of thick white sputum; hypoxia and blood gas values with PaO_2 below 60 mm Hg, with an early respiratory alkalosis and later respiratory acidosis; mental status changes varying from headache and mild agitation to delirium and coma. The chest radiograph exhibits a typical "snowstorm" infiltrate. Eventually, acute pulmonary edema, acute respiratory distress syndrome (ARDS), and heart failure may develop.
- With systemic embolization, the patient appears pale. Petechiae appear in the buccal membranes and conjunctival sacs, on the hard palate, and over the chest and anterior axillary folds. Fever (temperature above 39.5°C [103°F]) develops. Free fat may be found in the urine when emboli reach the kidneys. Acute tubular necrosis and renal failure may develop.
- Compartment syndrome (occurs when perfusion pressure falls below tissue pressure within a closed anatomic compartment). Acute compartment syndrome may produce deep, throbbing, unrelenting pain not controlled by opioids (can be due to a tight cast or constrictive dressing or an increase in muscle compartment contents because of edema

or hemorrhage). Cyanotic (blue-tinged) nail beds and pale or dusky and cold fingers or toes are present; nail bed capillary refill times are prolonged (greater than 3 seconds); pulse may be diminished (Doppler) or absent; and motor weakness, paralysis, and paresthesia may occur.

- Manifestations of disseminated intravascular coagulation (DIC) include unexpected bleeding after surgery and bleeding from the mucous membranes, venipuncture sites, and gastrointestinal and urinary tracts.
- Symptoms of infection may include tenderness, pain, redness, swelling, local warmth, elevated temperature, and purulent drainage.
- Nonunion is manifested by persistent discomfort and abnormal movement at the fracture site. Some risk factors include infection at the fracture site, interposition of tissue between the bone ends, inadequate immobilization or manipulation that disrupts callus formation, excessive space between bone fragments, limited bone contact, and impaired blood supply resulting in AVN.
- Manifestations of other complications may be noted (DVT, thromboembolism, pulmonary embolus). See specific disorders for additional information.

NURSING ALERT

Avoid testing for crepitus because testing can cause further tissue damage. Subtle personality changes, restlessness, irritability, or confusion in a patient who has sustained a fracture are indications for immediate blood gas studies.

Assessment and Diagnostic Findings

The diagnosis of a fracture depends on the symptoms, the physical signs, and radiographic examination. Usually, the patient reports an injury to the area.

Gerontologic Considerations

Hip fractures are frequent contributors to physical disability and institutionalization among the elderly. Muscle weakness may have initially contributed to the fall and fracture. Stress

and immobility related to the trauma predispose the older adult to atelectasis, pneumonia, sepsis, venous thromboemboli, pressure ulcers, and reduced ability to cope with other health problems. Many elderly people hospitalized with hip fractures exhibit delirium as a result of the stress of the trauma, unfamiliar surroundings, sleep deprivation, and medications. Because dehydration and poor nutrition may be present, the patient needs to be encouraged to consume adequate fluids and a healthy diet.

Medical Management

Emergency Management

- Immediately after injury, immobilize the body part before the patient is moved.
- Splint the fracture, including joints adjacent to the fracture, to prevent movement of fracture fragments.
- Immobilization of the long bones of the lower extremities may be accomplished by bandaging the legs together, with the unaffected extremity serving as a splint for the injured one.
- In an upper extremity injury, the arm may be bandaged to the chest, or an injured forearm may be placed in a sling.
- Assess neurovascular status distal to the injury both before and after splinting to determine adequacy of peripheral tissue perfusion and nerve function.
- Cover the wound of an open fracture with a sterile dressing to prevent contamination of deeper tissues.

Reduction of Fractures

- The fracture is reduced ("setting" the bone) using a closed method (manipulation and manual traction [eg, splint or cast]) or an open method (surgical placement of internal-fixation devices [eg, metallic pins, wires, screws, plates, nails, or rods]) to restore the fracture fragments to anatomic alignment and rotation. The specific method depends on the nature of the fracture.
- After the fracture has been reduced, immobilization holds the bone in correct position and alignment until union occurs. Immobilization is accomplished by external or internal fixation.

- Function is maintained and restored by controlling swelling by elevating the injured extremity and applying ice as prescribed. Restlessness, anxiety, and discomfort are controlled using a variety of approaches (eg, reassurance, position changes, and pain relief strategies, including use of analgesics). Isometric and muscle-setting exercises are encouraged to minimize atrophy and to promote circulation. With internal fixation, the surgeon determines the amount of movement and weight-bearing stress the extremity can withstand and prescribes the level of activity.

Management of Complications

- Treatment of shock consists of stabilizing the fracture to prevent further hemorrhage, restoring blood volume and circulation, relieving the patient's pain, providing proper immobilization, and protecting the patient from further injury and other complications. See "Nursing Management" under "Shock Hypovolemic" in Chapter S for additional information.
- Prevention and management of fat embolism include immediate immobilization of fractures, adequate support for fractured bones during turning and positioning, and maintenance of fluid and electrolyte balance. Prompt initiation of respiratory support with prevention of respiratory and metabolic acidosis and correction of homeostatic disturbances is essential. Corticosteroids as well as vasopressor medications may be given.
- Compartment syndrome is managed by controlling swelling by elevating the extremity to heart level or by releasing restrictive devices (dressings or cast). A fasciotomy (surgical decompression with excision of the fascia) may be needed to relieve the constrictive muscle fascia. The wound remains open and covered with moist sterile saline dressings for 3 to 5 days. The limb is splinted and elevated. Prescribed passive range-of-motion exercises may be performed every 4 to 6 hours.
- Nonunion (failure of the ends of a fractured bone to unite) is treated with internal fixation, bone grafting (osteogenesis, osteoconduction, osteoinduction), electrical bone stimulation, or a combination of these.

- Management of reaction to internal fixation devices involves protection from refracture related to osteoporosis, altered bone structure, and trauma.
- Management of CRPS involves elevation of the extremity; pain relief; range-of-motion exercises; and helping patients with chronic pain, disuse atrophy, and osteoporosis. Avoid taking blood pressure or performing venipuncture in the affected extremity.
- Other complications are treated as indicated (see specific disorders).

Nursing Management

Managing Closed Fractures

- Instruct the patient regarding the proper methods to control edema and pain (eg, elevate extremity to heart level, take analgesics as prescribed).
- Teach exercises to maintain the health of unaffected muscles and to strengthen muscles needed for transferring and for using assistive devices (eg, crutches, walker).
- Teach patients how to use assistive devices safely.
- Arrange to help patients modify their home environment as needed and to secure personal assistance if necessary.
- Provide patient teaching, including self-care, medication information, monitoring for potential complications, and the need for continuing health care supervision.

Managing Open Fractures

- The objectives of management are to prevent infection of the wound, soft tissue, and bone and to promote healing of bone and soft tissue. In an open fracture, there is the risk of osteomyelitis, tetanus, and gas gangrene.
- Administer IV antibiotics immediately upon the patient's arrival in the hospital along with tetanus toxoid if needed.
- Perform wound irrigation and debridement.
- Elevate the extremity to minimize edema.
- Assess neurovascular status frequently.
- Take the patient's temperature at regular intervals, and monitor for signs of infection.

Managing Fractures at Specific Sites

Maximum functional recovery is the goal of management.

Clavicle

- Fracture of the clavicle (collar bone) is a common injury that results from a fall or a direct blow to the shoulder. Monitor the circulation and nerve function of the affected arm and compare with the unaffected arm to determine variations, which may indicate disturbances in neurovascular status. Caution the patient not to elevate the arm above shoulder level until the fracture has healed (about 6 weeks). Encourage the patient to exercise the elbow, wrist, and fingers as soon as possible and, when prescribed, to perform shoulder exercises. Tell the patient that vigorous activity is limited for 3 months.

Humeral Neck

- With humeral neck fractures (seen most frequently in older women after a fall on an outstretched arm), perform neurovascular assessment of the involved extremity to evaluate the extent of injury and possible involvement of the nerves and blood vessels of the arm. Teach the patient to support the arm and immobilize it by a sling and swathe that secure the supported arm to the trunk. Begin pendulum exercises as soon as tolerated by the patient. Instruct the patient to avoid vigorous activity for an additional 10 to 14 weeks. Inform the patient that residual stiffness, aching, and some limitation of range of motion may persist for 6 or more months. When a humeral neck fracture is displaced with required fixation, exercises are started only after a prescribed period of immobilization.
- With humeral shaft fractures, the nerves and brachial blood vessels may be injured, so neurovascular assessment is essential to monitor the status of the nerve or blood vessels. Use well-padded splints to initially immobilize the upper arm and to support the arm in 90 degrees of flexion at the elbow, use a sling or collar and cuff to support the forearm, and use external fixators to treat open fractures of the humeral shaft. Functional bracing may also be used for these fractures. Teach patient to perform pendulum shoulder exercises and isometric exercises as prescribed.

Elbow

- Elbow fractures (distal humerus) may result in injury to the median, radial, or ulnar nerves. Evaluate the patient for paresthesia and signs of compromised circulation in the forearm and hand. Monitor closely for Volkmann's ischemic contracture (an acute compartment syndrome) as well as for hemarthrosis (blood in the joint). Reinforce information regarding reduction and fixation of the fracture and planned active motion when swelling has subsided and healing has begun. Explain care if the arm is immobilized in a cast or posterior splint with a sling. Encourage active finger exercises. Teach and encourage patient to do gentle range-of-motion exercise of the injured joint about 1 week after internal fixation.
- Radial head fractures are usually produced by a fall on the outstretched hand with the elbow extended. Instruct patient in use of a splint for immobilization. If the fracture is displaced, reinforce the need for postoperative immobilization of the arm in a posterior plaster splint and sling. Encourage the patient to carry out a program of active motion of the elbow and forearm when prescribed.

Wrist

Wrist fractures (distal radius [Colles' fracture]) usually result from a fall on an open, dorsiflexed hand. They are frequently seen in elderly women with osteoporotic bones and weak soft tissues that do not dissipate the energy of a fall. Reinforce care of the cast, or with more severe fractures with wire insertion, teach incision care. Instruct patient to keep the wrist and forearm elevated for 48 hours after reduction. Begin active motion of the fingers and shoulder promptly by teaching patient to do the following exercises to reduce swelling and prevent stiffness:

- Hold the hand at the level of the heart.
- Move the fingers from full extension to flexion. Hold and release. Repeat at least 10 times every hour when awake.
- Use the hand in functional activities.
- Actively exercise the shoulder and elbow, including complete range-of-motion exercises of both joints.

- Assess the sensory function of the median nerve by pricking the distal aspect of the index finger, and assess the motor function by testing patient's ability to touch the thumb to the little finger. If diminished circulation and nerve function is noted, treat promptly.

Hand and Fingers

- Hand trauma often requires extensive reconstructive surgery. The objective of treatment is always to regain maximum function of the hand. With a nondisplaced fracture, the finger is splinted for 3 to 4 weeks to relieve pain and protect the fingertip from further trauma, but displaced fractures and open fractures may require open reduction with internal fixation, using wires or pins.
- Evaluate the neurovascular status of the injured hand. Teach the patient to control swelling by elevating the hand. Encourage functional use of the uninvolved portions of the hand.

Pelvis

- Pelvic fractures may be caused by falls, motor vehicle crashes, or crush injuries. At least two thirds of these patients have significant and multiple injuries.
- Monitor for symptoms, including ecchymosis; tenderness over the symphysis pubis, anterior iliac spines, iliac crest, sacrum, or coccyx; local edema; numbness or tingling of the pubis, genitals, and proximal thighs; and inability to bear weight without discomfort.
- Complete a neurovascular assessment of the lower extremities to detect injury to pelvic blood vessels and nerves. Monitor for hemorrhage and shock, two of the most serious consequences that may occur. Palpate both lower extremities for absence of peripheral pulses, which may indicate a torn iliac artery or one of its branches.
- Assess for injuries to the bladder, rectum, intestines, other abdominal organs, and pelvic vessels and nerves. Examine urine for blood to assess for urinary tract injury. In male patients, do not insert a catheter until the status of the urethra is known. Monitor for diffuse and intense abdominal pain, hyperactive or absent bowel sounds, and abdominal

rigidity and resonance (free air) or dullness to percussion (blood), which suggest injury to the intestines or abdominal bleeding.
- If patient has a stable pelvic fracture, maintain patient on bed rest for a few days and provide symptom management until the pain and discomfort are controlled.
- Provide fluids, dietary fiber, ankle and leg exercises, antiembolism stockings to aid venous return, logrolling, deep breathing, and skin care to reduce the risk for complications and to increase comfort.
- Monitor bowel sounds. If patient has a fracture of the coccyx and experiences pain on sitting and with defecation, assist with sitz baths as prescribed to relieve pain, and administer stool softeners to prevent the need to strain on defecation.
- As pain resolves, instruct patient to resume activity gradually, using assistive mobility devices for protected weight bearing. Patients with unstable pelvic fractures may be treated with external fixation or open reduction and internal fixation (ORIF).
- Promote hemodynamic stability and comfort, and encourage early mobilization.

Femur and Hip

- Femoral shaft fractures are most often seen in young adults involved in a motor vehicle crash or a fall from a high place. Frequently, these patients have associated multiple trauma and develop shock from a loss of 2 to 3 units of blood.
- Assess neurovascular status of the extremity, especially circulatory perfusion of the lower leg and foot (popliteal, posterior tibial, and pedal pulses and toe capillary refill time as well as Doppler ultrasound monitoring).
- Note signs of dislocation of the hip and knee, and knee effusion, which may suggest ligament damage and possible instability of the knee joint.
- Apply and maintain skeletal traction or splint to achieve muscle relaxation and alignment of the fracture fragments before ORIF procedures, and later a cast brace.
- Assist patient in minimal partial weight bearing when indicated and progress to full weight bearing as tolerated.
- Reinforce that the cast brace is worn for 12 to 14 weeks.

- Instruct in and encourage patient to perform exercises of lower leg, foot, and toes on a regular basis. Assist patient in performing active and passive knee exercises as soon as possible, depending on the management approach and the stability of the fracture and knee ligaments.

Tibia and Fibula

- Tibia and fibula fractures (most common fractures below the knee) tend to result from a direct blow, falls with the foot in a flexed position, or a violent twisting motion.
- Provide instruction on care of the long leg walking cast or patellar-tendon-bearing cast.
- Instruct patient in and assist with partial weight bearing, usually in 7 to 10 days.
- Instruct patient on care of a short leg cast or brace (in 3 to 4 weeks), which allows for knee motion.
- Instruct patient in care of skeletal traction, if applicable. Encourage patient to perform hip, foot, and knee exercises within the limits of the immobilizing device.
- Instruct patient to begin weight bearing when prescribed (usually in about 4 to 8 weeks).
- Instruct patient to elevate extremity to control edema.
- Perform continuous neurovascular evaluation.

Rib

- Rib fractures occur frequently in adults and usually result in no impairment of function but produce painful respirations. Assist patient to cough and take deep breaths by splinting the chest with hands or pillow during cough. Reassure patient that pain associated with rib fracture diminishes significantly in 3 or 4 days, and the fracture heals within 6 weeks. Monitor for complications, which may include atelectasis, pneumonia, a flail chest, pneumothorax, and hemothorax. (See specific disorders for nursing management.)

For more information, see Chapter 69 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.



G

Gastritis

Gastritis is inflammation of the stomach mucosa. Acute gastritis lasts several hours to a few days and is often caused by dietary indiscretion (eating irritating food that is highly seasoned or food that is infected). Other causes include excessive use of aspirin and other nonsteroidal anti-inflammatory drugs (NSAIDs), excessive alcohol intake, bile reflux, and radiation therapy. A more severe form of acute gastritis is caused by strong acids or alkali, which may cause the mucosa to become gangrenous or to perforate. Gastritis may also be the first sign of acute systemic infection.

Chronic gastritis is a prolonged inflammation of the stomach that may be caused either by benign or malignant ulcers of the stomach or by bacteria such as *Helicobacter pylori*. Chronic gastritis may be associated with autoimmune diseases such as pernicious anemia, dietary factors such as caffeine, the use of medications such as NSAIDs or bisphosphonates (eg, alendronate [Fosamax], risedronate [Actonel], ibandronate [Boniva]), alcohol, smoking, or chronic reflux of pancreatic secretions and bile into the stomach. Superficial ulceration may occur and can lead to hemorrhage.

Clinical Manifestations

Acute Gastritis

May have rapid onset of symptoms: abdominal discomfort, headache, lassitude, nausea, anorexia, vomiting, and hiccupping

Chronic Gastritis

- May be asymptomatic.
- Complaints of anorexia, heartburn after eating, belching, a sour taste in the mouth, or nausea and vomiting.
- Patients with chronic gastritis from vitamin deficiency usually have evidence of malabsorption of vitamin B_{12}.

Assessment and Diagnostic Findings

- Gastritis is sometimes associated with achlorhydria or hypochlorhydria (absence or low levels of hydrochloric acid) or with high acid levels.
- Upper gastrointestinal (GI) x-ray series, endoscopy.
- Biopsy with histologic examination are performed.
- Serologic testing for antibodies to the *H. pylori* antigen and a breath test may be performed.

Medical Management

Acute Gastritis

The gastric mucosa is capable of repairing itself after an episode of gastritis. As a rule, the patient recovers in about 1 day, although the appetite may be diminished for an additional 2 or 3 days. The patient should refrain from alcohol and eating until symptoms subside. Then the patient can progress to a nonirritating diet. If symptoms persist, intravenous fluids may be necessary. If bleeding is present, management is similar to that of upper GI tract hemorrhage.

If gastritis is due to ingestion of strong acids or alkali, dilute and neutralize the acid with common antacids (eg, aluminum hydroxide); neutralize alkali with diluted lemon juice or diluted vinegar. If corrosion is extensive or severe, avoid emetics and lavage because of danger of perforation.

Supportive therapy may include nasogastric intubation, analgesic agents and sedatives, antacids, and IV fluids.

Fiberoptic endoscopy may be necessary; emergency surgery may be required to remove gangrenous or perforated tissue; gastric resection (gastrojejunostomy) may be necessary to treat pyloric obstruction.

Chronic Gastritis

Diet modification, rest, stress reduction, avoidance of alcohol and NSAIDs, and pharmacotherapy are key treatment measures. Gastritis related to *H. pylori* infection is treated with selected drug combinations.

Nursing Management

Reducing Anxiety

- Carry out emergency measures for ingestion of acids or alkalies.

- Offer supportive therapy to patient and family during treatment and after the ingested acid or alkali has been neutralized or diluted.
- Prepare patient for additional diagnostic studies (endoscopy) or surgery.
- Calmly listen to and answer questions as completely as possible; explain all procedures and treatments.

Promoting Optimal Nutrition

- Provide physical and emotional support for patients with acute gastritis.
- Help patient manage symptoms (eg, nausea, vomiting, heartburn, and fatigue).
- Avoid foods and fluids by mouth for hours or days until acute symptoms subside.
- Offer ice chips and clear liquids when symptoms subside.
- Encourage patient to report any symptoms suggesting a repeat episode of gastritis as food is introduced.
- Discourage caffeinated beverages (caffeine increases gastric activity and pepsin secretion), alcohol, and cigarette smoking (nicotine inhibits neutralization of gastric acid in the duodenum).
- Refer patient for alcohol counseling and smoking cessation when appropriate.

Promoting Fluid Balance

- Monitor daily intake and output for dehydration (minimal intake of 1.5 L/day and urine output of 30 mL/h). Infuse intravenous fluids if prescribed.
- Assess electrolyte values every 24 hours for fluid imbalance.
- Be alert for indicators of hemorrhagic gastritis (hematemesis, tachycardia, hypotension), and notify physician.

Relieving Pain

- Instruct patient to avoid foods and beverages that may be irritating to the gastric mucosa.
- Instruct patient in the correct use of medications to relieve chronic gastritis.
- Assess pain and attainment of comfort through use of medications and avoidance of irritating substances.

Teaching Patients Self-Care

- Assess knowledge about gastritis and develop an individualized teaching plan that incorporates patient's pattern of eating, daily caloric needs, and food preferences.
- Provide a list of substances to avoid (caffeine, nicotine, spicy foods, irritating or highly seasoned foods, alcohol); consult with nutritionist if indicated.
- Educate about antibiotic agents, antacids, bismuth salts, sedative medications, or anticholinergic agents that may be prescribed.
- When necessary, reinforce the importance of completing the medication regimen as prescribed to eradicate *H. pylori* infection.

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For more information, see Chapter 37 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Glaucoma

The term *glaucoma* is used to refer to a group of ocular conditions characterized by optic nerve damage. In the past, glaucoma was seen more as a condition of elevated intraocular pressure (IOP) than of optic neuropathy. Increasingly, that is no longer the case. There is no doubt that increased IOP damages the optic nerve and nerve fiber layer, but the degree of harm is highly variable. The optic nerve damage is related to the IOP caused by congestion of aqueous humor in the eye.

Glaucoma is the second leading causes of blindness among adults in the United States. Most cases are asymptomatic until extensive and irreversible damage has occurred. Glaucoma affects people of all ages but is more prevalent with increasing age (above 40 years). Others at risk are patients with diabetes, African Americans, those individuals with a family history of glaucoma, and people with previous eye trauma or surgery or those who have had long-term steroid treatment. There is no cure for glaucoma, but the disease can be controlled.

Classification of Glaucomas

There are several types of glaucoma. Current clinical forms of glaucoma are identified as open-angle glaucoma, angle-closure glaucoma (also called pupillary block), congenital glaucoma, and glaucoma associated with other conditions. Glaucoma can be primary or secondary, depending on whether associated factors contribute to the rise in IOP. The two common clinical forms of glaucoma encountered in adults are primary open-angle glaucoma (POAG) and angle-closure glaucoma, which are differentiated by the mechanisms that cause impaired aqueous outflow.

Clinical Manifestations

- Most patients are unaware that they have the disease until they have experienced visual changes and vision loss.
- Symptoms may include blurred vision or "halos" around lights, difficulty focusing, difficulty adjusting eyes in low lighting, loss of peripheral vision, aching or discomfort around the eyes, and headache.
- Pallor and cupping of the optic nerve disc; as the optic nerve damage increases, visual perception in the area is lost.

Assessment and Diagnostic Methods

- Ocular and medical history (to investigate predisposing factors)
- Diagnostic tests include tonometry (measures IOP), ophthalmoscopy (to inspect the optic nerve), gonioscopy (to examine the filtration angle of the anterior chamber), and perimetry (visual fields assessment) are major diagnostic tests.

Medical Management

The aim of all glaucoma treatment is prevention of optic nerve damage. Lifelong therapy is almost always necessary because glaucoma cannot be cured. Treatment focuses on pharmacologic therapy, laser procedures, surgery, or a combination of these approaches, all of which have potential complications and side effects. The objective is to achieve the greatest benefit at the least risk, cost, and inconvenience to the patient. Although treatment cannot reverse optic nerve damage, further

damage can be controlled. The goal is to maintain an IOP within a range unlikely to cause further damage.

Pharmacologic Therapy

Medical management of glaucoma relies on systemic and topical ocular medications that lower IOP. Periodic follow-up examinations are essential to monitor IOP, the appearance of the optic nerve, the visual fields, and side effects of medications. Therapy takes into account the patient's health and stage of glaucoma.

- Patient is usually started on the lowest dose of topical medication and then advanced to increased concentrations until the desired IOP level is reached and maintained.
- One eye is treated first, with the other eye used as a control in determining the efficacy of the medication.
- Several types of ocular medications are used to treat glaucoma, including miotics (medications that cause pupillary constriction), adrenergic agonists (ie, sympathomimetic agents), beta-blockers, $alpha_2$-agonists (ie, adrenergic agents), carbonic anhydrase inhibitors, and prostaglandins.

Surgical Management

- Laser trabeculoplasty or iridotomy indicated when IOP is inadequately controlled by medications.
- Filtering procedures: an opening or a fistula in the trabecular meshwork; trabeculectomy is standard technique.
- Drainage implant or shunt surgery may be performed.
- Trabectome surgery is reserved for patients in whom pharmacologic treatment and/or laser trabeculoplasty do not control the IOP sufficiently.

Nursing Management

- Create a teaching plan regarding the nature of the disease and the importance of strict adherence to the medication regimen to help ensure compliance.
- Review the patient's medication program, particularly the interactions of glaucoma-control medications with other medications.
- Explain effects of glaucoma-control medications on vision (eg, miotics and sympathomimetics result in altered focus;

therefore, patients need to be cautious in navigating their surroundings).

- Refer patient to services that assist in performing activities of daily living, if needed.
- Refer patients with impaired mobility for low vision and rehabilitation services; patients who meet the criteria for legal blindness should be offered referrals to agencies that can assist them in obtaining federal assistance.
- Provide reassurance and emotional support.
- Integrate patient's family into the plan of care, and because the disease has a familial tendency, encourage family members to undergo examinations at least once every 2 years to detect glaucoma early.

For more information, see Chapter 58 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Glomerulonephritis, Chronic

Chronic glomerulonephritis may be due to repeated episodes of acute nephritic syndrome, hypertensive nephrosclerosis, hyperlipidemia, chronic tubulointerstitial injury, or hemodynamically mediated glomerular sclerosis. The kidneys are reduced to as little as one fifth of their normal size and consist largely of fibrous tissue. The cortex layer shrinks to 1 to 2 mm in thickness or less, scarring occurs, and the branches of the renal artery are thickened. The resulting severe glomerular damage can progress to stage 5 chronic kidney disease (CKD) and require renal replacement therapies.

Clinical Manifestations

Symptoms are variable. Some patients with severe disease have no symptoms for many years.

- Hypertension or elevated blood urea nitrogen (BUN) and serum creatinine levels.
- General symptoms: loss of weight and strength, increasing irritability, and an increased need to urinate at night (nocturia); headaches, dizziness, and digestive disturbances are also common.

Renal Insufficiency and Chronic Renal Failure

- Patient appears poorly nourished with a yellow-gray pigmentation of the skin, periorbital and peripheral edema, and pale mucous membranes.
- Blood pressure is normal or severely elevated.
- Retinal findings include hemorrhage, exudate, narrowed tortuous arterioles, and papilledema.
- Anemia causes pale membranes.
- Cardiomegaly, gallop rhythm, distended neck veins, and other signs of heart failure may be present.
- Crackles in lungs.
- Possibly, peripheral neuropathy with diminished deep tendon reflexes.
- Neurosensory changes occur late in the illness, resulting in confusion and limited attention span. Other late signs include pericarditis with pericardial friction rub and pulsus paradoxus.

Assessment and Diagnostic Findings

On laboratory analysis, the following abnormalities may be found:

- Urinalysis: fixed specific gravity of 1.010, variable proteinuria, and urinary casts
- Blood studies related to renal failure progression: hyperkalemia, metabolic acidosis, anemia, hypoalbuminemia, decreased serum calcium and increased serum phosphorus, and hypermagnesemia
- Impaired nerve conduction; mental status changes
- Chest x-rays: cardiac enlargement and pulmonary edema
- Electrocardiogram (ECG): normal or may reflect left ventricular hypertrophy
- Computed tomography (CT) and magnetic resonance imaging (MRI) scans show a decrease in the size of the renal cortex

Medical Management

The treatment of ambulatory patients is guided by symptoms.

- If hypertension is present, the blood pressure is lowered with sodium and water restriction, antihypertensive agents, or both.

- Weight is monitored daily, and diuretic medications are prescribed to treat fluid overload.
- Proteins of high biologic value are provided to support good nutritional status (dairy products, eggs, meats).
- Urinary tract infections are treated promptly.
- Dialysis is considered early in the course of disease to keep patient in optimal physical condition, prevent fluid and electrolyte imbalances, and minimize the risk of complications of renal failure.

Nursing Management

- Observe for common fluid and electrolyte disturbances in renal disease; report changes in fluid and electrolyte status and in cardiac and neurologic status.
- Give emotional support throughout the disease and treatment course by providing opportunities for patient and family to verbalize concerns. Answer questions and discuss options.
- Educate patient and family about prescribed treatment plan and the risk of noncompliance. Explain about need for follow-up evaluations of blood pressure, urinalysis for protein and casts, blood for BUN, and creatinine.
- If long-term dialysis is needed, teach the patient and family about the procedure, how to care for the access site, dietary restrictions, and other necessary lifestyle modifications.
- Refer to community health or home care nurse for assessment of patient progress and continued education about problems to report to health care provider.
- Remind patient and family of the importance of participation in health promotion activities, including health screening.
- Instruct patient to inform all health care providers about the diagnosis of glomerulonephritis.

For more information, see Chapter 44 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Gout

Gout is a heterogeneous group of inflammatory conditions related to a genetic defect of purine metabolism and resulting in hyperuricemia.

Pathophysiology

In gout, there is an oversecretion of uric acid or a renal defect resulting in decreased excretion of uric acid, or a combination of both. Primary hyperuricemia may be due to severe dieting or starvation, excessive intake of foods high in purines (shellfish, organ meats), or heredity. In secondary hyperuricemia, the gout is a clinical feature secondary to any of a number of genetic or acquired processes, including conditions with an increase in cell turnover (leukemias, multiple myeloma, psoriasis, some anemias) and an increase in cell breakdown.

Clinical Manifestations

Gout is characterized by deposits of uric acid in various joints. Four stages of gout can be identified: asymptomatic hyperuricemia, acute gouty arthritis, intercritical gout, and chronic tophaceous gout.

- Acute arthritis of gout is the most common early sign.
- The metatarsophalangeal (MTP) joint of the big toe is most commonly affected; the tarsal area, ankle, or knee may also be affected.
- The acute attack may be triggered by trauma, alcohol ingestion, dieting, medication, surgical stress, or illness.
- Abrupt onset occurs at night, causing severe pain, redness, swelling, and warmth over the affected joint.
- Early attacks tend to subside spontaneously over 3 to 10 days without treatment.
- The next attack may not come for months or years; in time, attacks tend to occur more frequently, involve more joints, and last longer.
- Tophi are generally associated with frequent and severe inflammatory episodes.
- Higher serum concentrations of uric acid are associated with tophus formation.
- Tophi occur in the synovium, olecranon bursa, subchondral bone, infrapatellar and Achilles' tendons, subcutaneous tissue, and overlying joints.
- Tophi have also been found in aortic walls, heart valves, nasal and ear cartilage, eyelids, cornea, and sclerae.
- Joint enlargement may cause loss of joint motion.

- Uric acid deposits may cause renal stones and kidney damage.

Assessment and Diagnostic Methods

A definitive diagnosis of gouty arthritis is established by polarized light microscopy of the synovial fluid of the involved joint. Uric acid crystals are seen within the polymorphonuclear leukocytes in the fluid.

Medical Management

- Colchicine (oral or parenteral), an NSAID such as indomethacin, or a corticosteroid is prescribed to relieve an acute attack of gout.
- Hyperuricemia, tophi, joint destruction, and renal problems are treated after the acute inflammatory process has subsided.
- Uricosuric agents, such as probenecid, correct hyperuricemia and dissolve deposited urate.
- Allopurinol is effective when renal insufficiency or renal calculi are a risk.
- Corticosteroids may be used in patients who have no response to other therapy.
- Prophylactic treatment considered if patient experiences several acute episodes or there is evidence of tophi formation.

Nursing Management

Encourage patient to restrict consumption of foods high in purines, especially organ meats, and to limit alcohol intake. Encourage patient to maintain normal body weight. These measures may help to prevent a painful episode of gout.

In an acute episode of gouty arthritis, pain management is essential. Review medications with patient and family. Stress the importance of continuing medications to maintain effectiveness. See "Nursing Management" under "Arthritis" for additional information.

For more information, see Chapter 54 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Guillain–Barré Syndrome (Polyradiculoneuritis)

Guillain–Barré syndrome (GBS) results in the acute, rapid segmental demyelination of peripheral nerves and some cranial nerves, producing ascending weakness with dyskinesia (inability to execute voluntary movements), hyporeflexia, and paresthesias (numbness). An antecedent event (most often a viral infection) precipitates clinical presentation.

Pathophysiology

GBS results from an autoimmune (cell-mediated and humoral) attack on peripheral nerve myelin proteins (substances speeding conduction of nerve impulses). The Schwann cell (which produces myelin in the peripheral nervous system) is spared in GBS, allowing for remyelination in the recovery phase of the disease.

Clinical Manifestations

- Classic clinical features of GBS include areflexia and ascending weakness, although there may be variations in presentation. GBS does not affect cognitive function or level of consciousness.
- Initial symptoms include muscle weakness and diminished reflexes of the lower extremities; hyporeflexia and weakness may progress to tetraplegia; demyelination of the nerves that innervate the diaphragm and intercostal muscles results in neuromuscular respiratory failure.
- Sensory symptoms include paresthesias of the hands and feet and pain related to the demyelination of sensory fibers.
- Optic nerve demyelination may result in blindness.
- Bulbar muscle weakness related to demyelination of the glossopharyngeal and vagus nerves results in the inability to swallow or clear secretions.
- Vagus nerve demyelination results in autonomic dysfunction, manifested by instability of the cardiovascular system (tachycardia, bradycardia, hypertension, or orthostatic hypotension).

Assessment and Diagnostic Findings

- Clinical presentation (symmetric weakness, diminished reflexes, and upward progression of motor weakness) and history of recent viral infection.
- Changes in vital capacity and negative inspiratory force are assessed to identify impending neuromuscular respiratory failure.
- Elevated protein levels are detected in cerebrospinal fluid (CSF) evaluation, without an increase in other cells.
- Evoked potential studies demonstrate a progressive loss of nerve conduction velocity.

Medical Management

- GBS is considered a medical emergency; patient is managed in an intensive care unit.
- Respiratory problems may require respiratory therapy or mechanical ventilation.
- Elective intubation may be implemented before the onset of extreme respiratory muscle fatigue.
- Anticoagulant agents and antiembolism stockings or sequential compression boots may be used to prevent thrombosis and pulmonary emboli.
- Plasmapheresis (plasma exchange) or intravenous immunoglobulin (IVIG) may be used to directly affect the peripheral nerve myelin antibody level.
- Continuous ECG monitoring: Observe and treat cardiac dysrhythmias and other labile complications of autonomic dysfunction. Tachycardia and hypertension are treated with short-acting medications such as alpha-adrenergic blocking agents. Hypotension is managed by increasing the amount of intravenous fluid administered.

NURSING PROCESS

The Patient with GBS

Assessment (Ongoing and Critical)

Monitor the patient for life-threatening complications (respiratory failure, cardiac dysrhythmias, deep vein

thrombosis [DVT]) so that appropriate interventions can be initiated. Assess the patient's and family's ability to cope and their use of coping strategies.

Diagnosis

Nursing Diagnoses

- Ineffective breathing pattern and impaired gas exchange related to rapidly progressive weakness and impending respiratory failure
- Impaired bed and physical mobility related to paralysis
- Imbalanced nutrition, less than body requirements, related to inability to swallow
- Impaired verbal communication related to cranial nerve dysfunction
- Fear and anxiety related to loss of control and paralysis

Collaborative Problems/Potential Complications

- Respiratory failure
- Autonomic dysfunction

Planning and Goals

Major goals include improved respiratory function, increased mobility, improved nutritional status, effective communication, decreased fear and anxiety, and absence of complications.

Nursing Interventions

Maintaining Respiratory Function

- Encourage use of incentive spirometry and provide chest physiotherapy.
- Monitor for changes in vital capacity and negative inspiratory force; if vital capacity falls, mechanical ventilation will be necessary (discuss the potential need for mechanical ventilation with the patient and family on admission, to provide time for psychological preparation and decision-making).
- Suction to maintain a clear airway.
- Assess blood pressure and heart rate frequently to identify autonomic dysfunction.

Enhancing Physical Mobility

- Provide passive range-of-motion exercises at least twice daily; support the paralyzed extremities in functional

positions. Change patient's position at least every 2 hours.

- Administer prescribed anticoagulant regimen to prevent DVT and pulmonary embolism; assist with physical therapy and position changes; use antiembolism stockings or sequential compression boots, and provide adequate hydration.
- Place padding over bony prominences such as elbows and heels to reduce the risk of pressure ulcers.

Providing Adequate Nutrition

- Collaborate with physician and dietitian to meet patient's nutritional and hydration needs. Provide adequate nutrition to prevent muscle wasting.
- Evaluate laboratory test results that may indicate malnutrition or dehydration (both of these conditions increase the risk for pressure ulcers).
- If patient has paralytic ileus, provide intravenous fluids and parenteral nutrition as prescribed, and monitor for return of bowel sounds.
- Provide gastrostomy tube feedings if patient cannot swallow.
- Assess the return of the gag reflex and bowel sounds before resuming oral nutrition.

Improving Communication

- Establish communication through lip reading, use of picture cards, or eye blinking.
- Collaborate with speech therapist, as indicated.

Decreasing Fear and Anxiety

- Refer patient and family to a support group.
- Allow and encourage family members to participate in physical care of patient after providing instruction and support.
- Provide patient with information about condition, emphasizing a positive appraisal of coping resources.
- Encourage relaxation exercises and distraction techniques.
- Create a positive attitude and atmosphere.
- Encourage diversional activities to decrease loneliness and isolation. Encouraging visitors, engaging visitors or

volunteers to read to the patient, listening to music or books on tape, and watching television are ways to alleviate the patient's sense of isolation.

Monitoring and Managing Potential Complications

- Assess respiratory function at regular and frequent intervals; monitor respiratory rate, the quality of respirations, and vital capacity.
- Watch for breathlessness while talking, shallow and irregular breathing, use of accessory muscles, tachycardia, weak cough, and changes in respiratory pattern.
- Monitor for and report cardiac dysrhythmias (through ECG monitoring), transient hypertension, orthostatic hypotension, DVT, pulmonary embolism, and urinary retention.

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE

- Teach patient and family about the disorder and its generally favorable prognosis.
- During the acute phase, instruct patient and family about strategies they can implement to minimize the effects of immobility and other complications.
- Explain care of patient and roles of patient and family in rehabilitation process.
- Use an interdisciplinary effort for family or caregiver education (nurse, physician, occupational and physical therapists, speech therapist, and respiratory therapist).

CONTINUING CARE

- Provide care in a comprehensive inpatient program or an outpatient program, if patient can travel by car, or encourage a home program of physical and occupational therapy.
- Support patient and family through long recovery phase, and promote involvement for return of former abilities.
- Remind or instruct patients and family members of the need for continuing health promotion and screening practices.

Evaluation

Expected Patient Outcomes

- Maintains effective respirations and airway clearance
- Shows increasing mobility

- Receives adequate nutrition and hydration
- Demonstrates recovery of speech
- Shows lessening fear and anxiety
- Remains free of complications

For more information, see Chapter 64 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.



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Headache

Headache (cephalgia) is one of the most common of all human physical complaints. Headache is actually a symptom rather than a disease entity and may indicate organic disease (neurologic), a stress response, vasodilation (migraine), skeletal muscle tension (tension headache), or a combination of these factors. A primary headache is one for which no organic cause can be identified. These types of headache include migraine, tension-type, and cluster headaches.

A secondary headache is a symptom associated with organic causes, such as a brain tumor or aneurysm, subarachnoid hemorrhage, stroke, severe hypertension, meningitis, and head injury.

Examples of secondary headaches include the following:

- Miscellaneous headaches associated with structural lesions
- Headache associated with head trauma
- Headache associated with vascular disorders (eg, subarachnoid hemorrhage)
- Headache associated with nonvascular intracranial disorders (eg, brain tumor)
- Headache associated with use of chemical substances or their withdrawal
- Headache associated with noncephalic infection
- Headache associated with metabolic disorder (eg, hypoglycemia)
- Headache or facial pain associated with disorder of the head or neck or their structures (eg, acute glaucoma)
- Cranial neuralgias (persistent pain of cranial nerve origin)

Migraine Headache

Migraine is a complex of symptoms characterized by periodic and recurrent attacks of severe headache. The cause of

migraine has not been clearly demonstrated, but it is primarily a vascular disturbance that occurs more commonly in women and has strong familial tendencies. Onset typically occurs in puberty, and the incidence is 18% in women and 6% in men.

Clinical Manifestations

Headache often begins in early morning (headache on awakening). The classic migraine attack can be divided into four phases: prodrome, aura, headache, and recovery.

Prodrome Phase

- Present in 60% of patients with migraine headache.
- Symptoms may occur consistently hours to days before onset of migraine.
- Depression, irritability, feeling cold, food cravings, anorexia, change in activity level, increased urination, diarrhea, or constipation may be noted with each migraine.

Aura Phase

- Occurs in a minority of patients and lasts less than 1 hour.
- Focal neurologic symptoms, predominantly visual disturbances (light flashes), occur and may be hemianoptic (occurring in half of the visual field).
- Numbness and tingling of lips, face, or hands; mild confusion; slight weakness of an extremity; and drowsiness and dizziness may be present.

Headache Phase

This phase, occurring in 60% of patients, involves a unilateral, throbbing headache that intensifies over several hours. Pain is severe and incapacitating, often associated with photophobia, nausea, and vomiting. Duration varies from about 4 to 72 hours.

Recovery Phase (Termination and Postdrome)

- Pain gradually subsides.
- There is a period of muscle contraction in the neck and scalp with associated muscle ache and localized tenderness, exhaustion, and mood changes.
- Any physical exertion exacerbates the headache pain.
- Patient may sleep for an extended period.

Assessment and Diagnostic Methods

- Physical assessment of head and neck
- Neurologic examination
- Detailed health and headache assessment and history; medication history
- Cerebral angiography, computed tomography (CT), or magnetic resonance imaging (MRI) if abnormalities on neurologic examination
- Electromyography (EMG) and laboratory tests (complete blood cell [CBC] count, electrolytes, glucose, creatinine, erythrocyte sedimentation rate, electrolytes, glucose, creatinine, and thyroid hormone levels)

Medical Management

Therapy is divided into abortive (symptomatic) and preventive approaches. Abortive approach is used for frequent attacks and is aimed at relieving or limiting a headache at onset or while in progress. Preventive approach is used for those who have frequent attacks at regular or predictable intervals and may have medical conditions that preclude abortive therapies.

Management of Acute Attack

Treatment varies greatly; close monitoring is indicated.

- Triptans: sumatriptan (Imitrex), naratriptan (Amerge), rizatriptan (Maxalt), zolmitriptan (Zomig), and almotriptan (Axert).
- Ergotamine preparations may be effective if taken early. Ergotamine preparations may be taken by mouth (*per os* [PO]), subcutaneous (SC) or intramuscular (IM) injections, sublingually, or rectally, or they may be inhaled. Cafergot is a combination of ergotamine and caffeine.
- NOTE: None of the triptan medications should be taken concurrently with medications containing ergotamine, because of the potential for a prolonged vasoactive reaction.
- Possibly, 100% oxygen by facemask for 15 minutes.
- Symptomatic therapy includes analgesics, sedatives, antianxiety agents, and antiemetics.

Prevention: Pharmacologic Therapy

- Daily use of medications thought to block the headache attack.
- Beta-blockers such as propranolol (Inderal), widely used. Also used are amitriptyline hydrochloride (Elavil), divalproex (Valproate), flunarizine (Sibelium), and serotonin antagonists (Pizotyline).
- Calcium antagonists used frequently (require several weeks until effective).
- Several antiseizure medications are being evaluated for migraine prevention (eg, topiramate [Topamax]).
- Other prophylactic medication therapy may include ergotamine tartrate (occasionally), lithium, naproxen (Naprosyn), and methysergide.

Nursing Management

Relieving Pain

- Attempt to abort headache early.
- Provide comfort measures (eg, a quiet, dark environment); elevate the head of bed 30 degrees. Administer medications if nonpharmacologic measures are ineffective.
- Provide symptomatic treatment, such as antiemetics, as indicated.

Promoting Home- and Community-Based Care

Teaching Patients Self-Care

- Teach that headaches, especially migraines, are likely to occur when patient is ill, overtired, or feeling stressed.
- Educate patient about the type of headache, its mechanism (if known), and appropriate changes in lifestyle to avoid triggers.
- Inform patient that regular sleep, meals, exercise, relaxation, and avoidance of dietary triggers may be helpful in avoiding headaches.
- Teach and reassure the patient with tension headaches that the headache is not the result of a brain tumor (common unspoken fear).
- Stress reduction techniques, such as biofeedback, exercise programs, and meditation, may prove helpful.

- Remind about the importance of following the prescribed treatment regimen, keeping follow-up appointments, and participating in health promotion activities and recommended health screenings.

Continuing Care

The National Headache Foundation provides a list of clinics in the United States and the names of physicians who are members of the American Association for the Study of Headaches.

Other Headache Types

Cluster Headache

Cluster headaches, another severe form of vascular headache, are seen most frequently in men. The attacks come in clusters of one to eight daily, with excruciating pain localized in the eye and orbit and radiating to the facial and temporal regions. The pain is accompanied by watering of the eye and nasal congestion lasting from 15 minutes to 3 hours and may have a crescendo–decrescendo pattern. They have been described as penetrating. They may be precipitated by alcohol, nitrites, vasodilators, and histamines.

Cranial Arteritis

Inflammation of the cranial arteries is characterized by a severe headache localized in the region of the temporal artery. The inflammation may be generalized or focal. This is a cause of headache in the older population, particularly those older than 70 years. Clinical manifestations include inflammation (eg, heat, redness, swelling, and tenderness or pain over the involved artery). A tender, swollen, or nodular temporal artery may be visible. Visual problems are caused by ischemia of the involved structures. The headache is treated with corticosteroid drugs (do not stop abruptly) and analgesic agents.

Tension Headache (Muscle Contraction Headache)

Emotional or physical stress may cause contraction of the muscles in the neck and scalp, resulting in tension headache. This is characterized by a steady, constant feeling of pressure that usually begins in the forehead, the temple, or the back of the neck. Tension headaches tend to be more chronic than

severe and are probably the most common type of headache. Relief may be obtained by local heat, massage, analgesics, antidepressants, and muscle relaxants. Reassure patient that the headache does not indicate a brain tumor, and teach stress reduction techniques (biofeedback, exercise, medication).

For more information, see Chapter 61 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Head Injury (Brain Injury)

Injuries to the head involve trauma to the scalp, skull, and brain. A head injury may lead to conditions ranging from mild concussion to coma and death; the most serious form is known as a traumatic brain injury (TBI). The most common causes of TBIs are falls (28%), motor vehicle crashes (20%), being struck by objects (19%), and assaults (11%). Groups at highest risk for TBI are persons 15 to 19 years of age, with a 2:1 male-to-female incidence ratio. Adults 75 years of age or older have the highest TBI-related hospitalization and death rates.

Clinical Manifestations

Symptoms, other than local, depend on the severity and the anatomical location of the underlying brain injury.

- Persistent, localized pain usually suggests fracture.
- Fractures of the cranial vault may or may not produce swelling in that region.
- Fractures of the base of the skull frequently produce hemorrhage from the nose, pharynx, or ears, and blood may appear under the conjunctiva.
- Ecchymosis may be seen over the mastoid (Battle's sign).
- Drainage of cerebrospinal fluid (CSF) from the ears and the nose suggests basal skull fracture.
- Drainage of CSF may cause serious infection (eg, meningitis) through a tear in the dura mater.
- Bloody spinal fluid suggests brain laceration or contusion.

- Brain injury may have various signs, including altered level of consciousness (LOC), pupillary abnormalities, altered or absent gag reflex or corneal reflex, neurologic deficits, change in vital signs (eg, respiration pattern, hypertension, bradycardia), hyperthermia or hypothermia, and sensory, vision, or hearing impairment.
- Signs of a postconcussion syndrome may include headache, dizziness, anxiety, irritability, and lethargy.
- In acute or subacute subdural hematoma, changes in LOC, pupillary signs, hemiparesis, coma, hypertension, bradycardia, and slowing respiratory rate are signs of expanding mass.
- Chronic subdural hematoma may result in severe headache, alternating focal neurologic signs, personality changes, mental deterioration, and focal seizures.

Assessment and Diagnostic Methods

- Physical examination and evaluation of neurologic status
- Radiographic studies: x-rays, CT, MRI
- Cerebral angiography

Scalp and Skull Injuries

- Scalp trauma may result in an abrasion (brush wound), contusion, laceration, or hematoma. The scalp bleeds profusely when injured. Scalp wounds are a portal of entry for intracranial infections.
- Fracture of the skull is a break in the continuity of the skull caused by forceful trauma. Fractures may occur with or without damage to the brain. They are classified as simple, comminuted, depressed, or basilar and may be open (dura is torn) or closed (dura is not torn).

Medical Management

- Nondepressed skull fractures generally do not require surgical treatment but require close observation of patient.
- Depressed skull fractures usually require surgery with elevation of the skull and debridement, usually within 24 hours of injury.

Concussion (Brain Injury)

A cerebral concussion after head injury is a temporary loss of neurologic function with no apparent structural damage. A

concussion (also referred to as a mild TBI) may or may not produce a brief loss of consciousness. The mechanism of injury is usually blunt trauma from an acceleration–deceleration force, a direct blow, or a blast injury. If brain tissue in the frontal lobe is affected, the patient may exhibit bizarre irrational behavior, whereas involvement of the temporal lobe can produce temporary amnesia or disorientation.

Nursing Management

- Give information, explanations, and encouragement to reduce postconcussion syndrome.
- Instruct family to look for the following signs and notify physician or clinic: difficulty in awakening or speaking. Confusion, severe headache, vomiting, and weakness of one side of the body.

Contusion

A cerebral contusion is a moderate to severe head injury in which the brain is bruised and damaged in a specific area because of severe acceleration–deceleration force or blunt trauma. The impact of the brain against the skull leads to a contusion. Contusions are characterized by loss of consciousness associated with stupor and confusion. Other characteristics can include tissue alteration and neurologic deficit without hematoma formation, alteration in consciousness without localizing signs, hemorrhage into the tissue that varies in size and is surrounded by edema. The effects of injury (hemorrhage and edema) peak after about 18 to 36 hours. Patient outcome depends on the area and severity of the injury. Temporal lobe contusions carry a greater risk of swelling, rapid deterioration, and brain herniation. Deep contusions are more often associated with hemorrhage and destruction of the reticular activating fibers altering arousal.

Diffuse Axonal Injury

Diffuse axonal injury results from widespread shearing and rotational forces that produce damage throughout the brain—to axons in the cerebral hemispheres, corpus callosum, and brain stem. The injured area may be diffuse, with no identifiable focal lesion. The patient has no lucid intervals and

experiences immediate coma, decorticate and decerebrate posturing, and global cerebral edema. Diagnosis is made by clinical signs and a CT or MRI scan. Recovery depends on the severity of the axonal injury.

Intracranial Hemorrhage

Hematomas are collections of blood in the brain that may be epidural (above the dura), subdural (below the dura), or intracerebral (within the brain). (See Fig. 63-3 in Chapter 63 of *Brunner and Suddarth's textbook of medical-surgical nursing*.) Major symptoms are frequently delayed until the hematoma is large enough to cause distortion of the brain and increased intracranial pressure (ICP).

Epidural Hematoma (Extradural Hematoma or Hemorrhage)

Blood collects in the epidural space between the skull and dura mater. The hematoma can result from a skull fracture that causes a rupture or laceration of the middle meningeal artery, the artery that runs between the dura and the skull inferior to a thin portion of temporal bone. Symptoms are caused by the pressure of the expanding hematoma: usually, a momentary loss of consciousness at time of injury followed by an interval of apparent recovery while compensation for the increased volume occurs. When compensation is no longer possible, sudden signs of herniation may appear, including deterioration of consciousness and signs of focal neurologic deficits (dilation and fixation of a pupil or paralysis of an extremity); the patient deteriorates rapidly.

Medical Management

This is an extreme emergency because marked neurologic deficit or respiratory arrest may occur within minutes. Bur holes are made to remove the clots, and the bleeding point is controlled (craniotomy, drain insertion).

Subdural Hematoma

Blood collects between the dura and the underlying brain and is more frequently venous in origin. The most common cause is trauma, but it may also be associated with various bleeding tendencies (coagulopathies) or rupture of an aneurysm.

Subdural hematoma may be acute (major head injury), subacute (sequelae of less severe contusions), or chronic (minor head injuries in the elderly may be a cause; signs and symptoms fluctuate and may be mistaken for neurosis, psychosis, or stroke).

Intracerebral Hemorrhage and Hematoma

Bleeding occurs into the substance of the brain. Hematoma is commonly seen when forces are exerted to the head over a small area (missile injuries or bullet wounds; stab injury). It may also result from systemic hypertension causing degeneration and rupture of a vessel, rupture of a saccular aneurysm; vascular anomalies; intracranial tumors; bleeding disorders such as leukemia, hemophilia, aplastic anemia, and thrombocytopenia; and complications of anticoagulant therapy. Its onset may be insidious, with neurologic deficits followed by headache.

Medical Management

Presume that a person with a head injury has a cervical spine injury until proven otherwise. From the scene of the injury, the patient is transported on a board, with head and neck maintained in alignment with the axis of the body. Apply a cervical collar and maintain it until cervical spine x-rays have been obtained and the absence of cervical spinal cord injury documented. All therapy is directed toward preserving brain homeostasis and preventing secondary brain injury.

- Management involves control of ICP, supportive care (eg, ventilatory support, seizure prevention, fluid and electrolyte maintenance, nutritional support, and management of pain and anxiety), or craniotomy.
- Increased ICP is managed by adequate oxygenation, mannitol administration, ventilatory support, hyperventilation, elevation of the head of the bed, maintenance of fluid and electrolyte balance, nutritional support, pain and anxiety management, or neurosurgery.

See “Medical Management” and “Nursing Process” under “Increased Intracranial Pressure” for additional information.

NURSING PROCESS

The Patient with a TBI

Assessment

Obtain health history, including time of injury, cause of injury, direction and force of the blow, loss of consciousness, and condition following injury. Detailed neurologic information (LOC, ability to respond to verbal commands if patient is conscious), response to tactile stimuli (if patient is unconscious), pupillary response to light, corneal and gag reflexes, motor function, and system assessments provide baseline data. The Glasgow Coma Scale serves as a guide for assessing LOCs based on three criteria: (1) eye opening, (2) verbal responses, and (3) motor responses to a verbal command or painful stimulus.

Monitoring Vital Signs

- Monitor patient at frequent intervals to assess intracranial status.
- Assess for increasing ICP, including slowing of pulse, increasing systolic pressure, and widening pulse pressure. As brain compression increases, vital signs are reversed, pulse and respirations become rapid, and blood pressure may decrease.
- Monitor for rapid rise in body temperature; keep temperature below 38°C (100.4°F) to avoid increased metabolic demands on the brain.
- Keep in mind that tachycardia and hypotension may indicate bleeding elsewhere in the body.

Assessing Motor Function

- Observe spontaneous movements; ask patient to raise and lower extremities; compare strength and equality of the upper and lower extremities at periodic intervals.
- Note presence or absence of spontaneous movement of each extremity.
- Determine patient's ability to speak; note quality of speech.

- Assess responses to painful stimuli in absence of spontaneous movement; abnormal response carries a poorer prognosis.

Other Neurologic Signs
- Evaluate spontaneous eye opening.
- Evaluate size of pupils and reaction to light (unilaterally dilated and poorly responding pupils may indicate developing hematoma). If both pupils are fixed and dilated, it usually indicates overwhelming injury and poor prognosis.
- The patient with a head injury may develop deficits such as anosmia (lack of sense of smell), eye movement abnormalities, aphasia, memory deficits, and posttraumatic seizures or epilepsy.
- Patients may be left with residual psychosocial deficits and may lack insight into their emotional responses.

Diagnosis

Nursing Diagnoses
- Ineffective airway clearance and impaired gas exchange related to brain injury
- Ineffective cerebral tissue perfusion related to increased ICP, decreased cerebral perfusion pressure (CPP), and possible seizures
- Deficient fluid volume related to decreased LOC and hormonal dysfunction
- Imbalanced nutrition, less than body requirements, related to increased metabolic demands, fluid restriction, and inadequate intake
- Risk for injury (self-directed and directed at others) related to seizures, disorientation, restlessness, or brain damage
- Risk for imbalanced body temperature related to damaged temperature-regulating mechanisms in the brain
- Risk for impaired skin integrity related to bed rest, hemiparesis, hemiplegia, immobility, or restlessness
- Disturbed thought processes (deficits in intellectual function, communication, memory, information processing) related to brain injury

- Disturbed sleep pattern related to brain injury and frequent neurologic checks
- Interrupted family processes related to unresponsiveness of patient, unpredictability of outcome, prolonged recovery period, and the patient's residual physical disability and emotional deficit
- Deficient knowledge about brain injury, recovery, and the rehabilitation process

Collaborative Problems/Potential Complications

- Decreased cerebral perfusion
- Cerebral edema and herniation
- Impaired oxygenation and ventilation
- Impaired fluid, electrolyte, and nutritional balance
- Risk for posttraumatic seizures

Planning and Goals

Goals may include maintenance of a patent airway, adequate CPP, fluid and electrolyte balance, adequate nutritional status, prevention of secondary injury, maintenance of normal body temperature, maintenance of skin integrity, improvement of cognitive function, prevention of sleep deprivation, effective family coping, increased knowledge about the rehabilitation process, and absence of complications.

Nursing Interventions

Maintaining the Airway

- Position the unconscious patient to facilitate drainage of secretions; elevate the head of bed 30 degrees to decrease intracranial venous pressure.
- Establish effective suctioning procedures.
- Guard against aspiration and respiratory insufficiency.
- Monitor arterial blood gases (ABGs) to assess adequacy of ventilation.
- Monitor patient on mechanical ventilation for pulmonary complications (acute respiratory distress syndrome [ARDS] and pneumonia).

Maintaining Fluid and Electrolyte Balance

Fluid and electrolyte balance is particularly important in patients receiving osmotic diuretics, those with syndrome of

inappropriate antidiuretic hormone (SIADH) secretion, and those with posttraumatic diabetes insipidus.

- Monitor serum and urine electrolyte levels (including blood glucose and urine acetone), osmolality, and intake and output to evaluate endocrine function.
- Record daily weights (which may indicate fluid loss from diabetes insipidus).

Promoting Adequate Nutrition

- Parenteral nutrition (PN) via a central line or enteral feedings administered via a nasogastric or nasojejunal feeding tube may be used.
- Monitor laboratory values closely in patients receiving PN.
- Elevate the head of the bed and aspirate the enteral tube for evidence of residual feeding before administering additional feedings to help prevent distention, regurgitation, and aspiration; a continuous-drip infusion or pump may be used to regulate the feeding.
- Continue enteral or parenteral feedings until the swallowing reflex returns and the patient can meet caloric requirements orally.

Preventing Injury

- Observe for restlessness, which may be due to hypoxia, fever, pain, or a full bladder. Restlessness may also be a sign that the unconscious patient is regaining consciousness.
- Avoid restraints when possible because straining can increase ICP.
- Avoid bladder distention.
- Protect patient from injury (padded side rails, hands wrapped in mitts).
- Avoid using opioids for restlessness because they depress respiration, constrict pupils, and alter LOC.
- Keep environmental stimuli to a minimum.
- Provide adequate lighting to prevent visual hallucinations.
- Minimize disruption of patient's sleep/wake cycles.
- Lubricate the patient's skin with oil or emollient lotion to prevent irritation due to rubbing against the sheet.

- Use an external sheath catheter for incontinence because an indwelling catheter may produce infection.

Maintaining Body Temperature

- Monitor temperature every 2 to 4 hours.
- If temperature rises, try to identify the cause and administer acetaminophen and cooling blankets as prescribed to achieve normothermia.
- Monitor for infection related to fever.

Maintaining Skin Integrity

- Assess all body surfaces, and document skin integrity every 8 hours.
- Turn patient and reposition every 2 hours.
- Provide skin care every 4 hours.
- Assist patient to get out of bed three times a day (when appropriate).

Improving Cognitive Functioning

- Develop patient's ability to devise problem-solving strategies through cognitive rehabilitation over time; use a multidisciplinary approach.
- Be aware that there are fluctuations in orientation and memory and that these patients are easily distracted.
- Do not push to a level greater than patient's impaired cortical functioning allows because fatigue, anger, and stress (headache, dizziness) may occur; the Rancho Los Amigos Level of Cognitive Function scale is frequently used to assess cognitive function and evaluate ongoing recovery from head injury.

Preventing Sleep Pattern Disturbance

- Group nursing activities so that patient is disturbed less frequently.
- Decrease environmental noise, and dim room lights.
- Provide strategies (eg, back rubs) to increase comfort.

Supporting Family Coping

- Provide family with accurate and honest information.
- Encourage family to continue to set well-defined, mutual, short-term goals.
- Encourage family counseling to deal with feelings of loss and helplessness, and provide guidance in the management of inappropriate behaviors.

- Refer family to support groups that provide a forum for networking, sharing problems, and gaining assistance in maintaining realistic expectations and hope. The Brain Injury Association provides information and other resources.
- Assist patient and family in making decisions to end life support and permit donation of organs.

Monitoring and Managing Potential Complications

- Take measures to control CPP (eg, elevate the head of the bed and increase intravenous [IV] fluids).
- Take measures to control ICP (see section on "Increased Intracranial Pressure").
- Monitor for a patent airway, altered breathing pattern, and hypoxemia and pneumonia. Assist with intubation and mechanical ventilation.
- Provide enteral feedings, IV fluids and electrolytes, or insulin as prescribed.
- Initiate PN as ordered if patient is unable to eat.
- Assess carefully for development of posttraumatic seizures.

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE

- Reinforce information given to family about patient's condition and prognosis early in the course of head injury.
- As patient's status changes over time, focus teaching on interpretation and explanation of changes in patient's responses.
- Instruct patient and family about limitations that can be expected and complications that may occur if patient is to be discharged.
- Explain to the patient and family, verbally and in writing, how to monitor for complications that merit contacting the neurosurgeon.
- Teach about self-care management strategies, if patient's status indicates.
- Instruct about side effects of medications and importance of taking them as prescribed.

CONTINUING CARE

- Encourage patient to continue rehabilitation program after discharge. Improvement may take 3 or more years after injury, during which time the family and their coping skills need frequent assessment.
- Encourage patient to return to normal activities gradually.
- Remind the patient and family of the need for continuing health promotion and screening practices after the initial phase of care.

Evaluation

Expected Patient Outcomes

- Attains or maintains effective airway clearance, ventilation, and brain oxygenation.
- Achieves satisfactory fluid and electrolyte balance.
- Attains adequate nutritional status.
- Avoids injury.
- Maintains normal body temperature.
- Demonstrates intact skin integrity.
- Shows improvement in cognitive function and improved memory.
- Demonstrates normal sleep/wake cycle.
- Demonstrates absence of complications.
- Experiences no posttraumatic seizures.
- Family demonstrates adaptive coping processes.
- Patient and family participate in rehabilitation process as indicated.

For more information, see Chapter 63 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Heart Failure (Cor Pulmonale)

Heart failure (HF), sometimes referred to as congestive HF, is the inability of the heart to pump sufficient blood to meet the needs of the tissues for oxygen and nutrients. HF is a clinical syndrome characterized by signs and symptoms of fluid overload or inadequate tissue perfusion. The underlying mechanism of HF involves impaired contractile properties of the heart (systolic

dysfunction) or filling of the heart (diastolic) that leads to a lower-than-normal cardiac output. The low cardiac output can lead to compensatory mechanisms that cause increased workload on the heart and eventual resistance to filling of the heart.

HF is a progressive, life-long condition that is managed with lifestyle changes and medications to prevent episodes of acute decompensated HF, which are characterized by an increase in symptoms, decreased CO, and low perfusion. HF results from a variety of cardiovascular conditions, including chronic hypertension, coronary artery disease, and valvular disease. These conditions can result in systolic failure, diastolic failure, or both. Several systemic conditions (eg, progressive renal failure and uncontrolled hypertension) can contribute to the development and severity of cardiac failure.

Clinical Manifestations

The signs and symptoms of HF can be related to which ventricle is affected. Left-sided HF (left ventricular failure) causes different manifestations than right-sided HF (right ventricular failure). In chronic HF, patients may have signs and symptoms of both left and right ventricular failure.

Left-Sided HF

Most often precedes right-sided cardiac failure

- Pulmonary congestion: dyspnea, cough, pulmonary crackles, and low oxygen saturation levels; an extra heart sound, the S_3, or “ventricular gallop,” may be detected on auscultation.
- Dyspnea on exertion (DOE), orthopnea, paroxysmal nocturnal dyspnea (PND).
- Cough initially dry and nonproductive; may become moist over time.
- Large quantities of frothy sputum, which is sometimes pink (blood-tinged).
- Bibasilar crackles advancing to crackles in all lung fields.
- Inadequate tissue perfusion.
- Oliguria and nocturia.
- With progression of HF: altered digestion; dizziness, lightheadedness, confusion, restlessness, and anxiety; pale or ashen and cool and clammy skin.
- Tachycardia, weak, thready pulse; fatigue.

Right-Sided HF

- Congestion of the viscera and peripheral tissues
- Edema of the lower extremities (dependent edema), hepatomegaly (enlargement of the liver), ascites (accumulation of fluid in the peritoneal cavity), anorexia and nausea, and weakness and weight gain due to retention of fluid

Assessment and Diagnostic Methods

- Assessment of ventricular function
- Echocardiogram, chest x-ray, electrocardiogram (ECG)
- Laboratory studies: serum electrolytes, blood urea nitrogen (BUN), creatinine, thyroid-stimulating hormone (TSH), CBC count, brain natriuretic peptide (BNP), and routine urinalysis
- Cardiac stress testing, cardiac catheterization

Medical Management

The overall goals of management of HF are to relieve patient symptoms, to improve functional status and quality of life, and to extend survival. Treatment options vary according to the severity of the patient's condition and may include oral and IV medications, major lifestyle changes, supplemental oxygen, implantation of assistive devices, and surgical approaches, including cardiac transplantation. Lifestyle recommendations include restriction of dietary sodium; avoidance of excessive fluid intake, alcohol, and smoking; weight reduction when indicated; and regular exercise.

Pharmacologic Therapy

- Alone or in combination: vasodilator therapy (angiotensin-converting enzyme [ACE] inhibitors), angiotensin II receptor blockers (ARBs), select beta-blockers, calcium channel blockers, diuretic therapy, cardiac glycosides (digitalis), and others
- IV infusions: nesiritide, milrinzne, dobutamine
- Medications for diastolic dysfunction
- Possibly anticoagulants, medications that manage hyperlipidemia (statins)

Surgical Management

Coronary bypass surgery, percutaneous transluminal coronary angioplasty (PTCA), other innovative therapies as indicated (eg, mechanical assist devices, transplantation)

NURSING PROCESS

The Patient with HF

Assessment

The nursing assessment for the patient with HF focuses on observing for effectiveness of therapy and for the patient's ability to understand and implement self-management strategies. Signs and symptoms of pulmonary and systemic fluid overload are recorded and reported immediately.

- Note report of sleep disturbance due to shortness of breath, and number of pillows used for sleep.
- Ask patient about edema, abdominal symptoms, altered mental status, activities of daily living, and the activities that cause fatigue.
- Respiratory: Auscultate lungs to detect crackles and wheezes. Note rate and depth of respirations.
- Cardiac: Auscultate for S_3 heart sound (sign heart beginning to fail); document heart rate and rhythm.
- Assess sensorium and LOC.
- Periphery: Assess dependent parts of body for perfusion and edema and the liver for hepatojugular reflux; assess jugular venous distention.
- Measure intake and output to detect oliguria or anuria; weigh patient daily.

Diagnosis

Nursing Diagnoses

- Activity intolerance and fatigue related to decreased CO
- Excess fluid volume related to the HF syndrome
- Anxiety related to breathlessness from inadequate oxygenation
- Powerlessness related to chronic illness and hospitalizations
- Ineffective therapeutic regimen management related to lack of knowledge

Collaborative Problems/Potential Complications

- Hypotension, poor perfusion, and cardiogenic shock
- Dysrhythmias

- Thromboembolism
- Pericardial effusion and cardiac tamponade

Planning and Goals

Major goals for the patient may include promoting activity and reducing fatigue, relieving fluid overload symptoms, decreasing anxiety or increasing the patient's ability to manage anxiety, encouraging the patient to verbalize his or her ability to make decisions and influence outcomes, and teaching the patient about the self-care program.

Nursing Interventions

Promoting Activity Tolerance

- Monitor patient's response to activities. Instruct patient to avoid prolonged bed rest; patient should rest if symptoms are severe but otherwise should assume regular activity.
- Encourage patient to perform an activity more slowly than usual, for a shorter duration, or with assistance initially.
- Identify barriers that could limit patient's ability to perform an activity, and discuss methods of pacing an activity (eg, chop or peel vegetables while sitting at the kitchen table rather than standing at the kitchen counter).
- Take vital signs, especially pulse, before, during, and immediately after an activity to identify whether they are within the predetermined range; heart rate should return to baseline within 3 minutes. If patient tolerates the activity, develop short-term and long-term goals to increase gradually the intensity, duration, or frequency of activity.
- Refer to a cardiac rehabilitation program as needed, especially for patients with a recent myocardial infarction, recent open heart surgery, or increased anxiety.

Reducing Fatigue

- Collaborate with patient to develop a schedule that promotes pacing and prioritization of activities. Encourage patient to alternate activities with periods of rest and avoid having two significant energy-consuming activities occur on the same day or in immediate succession.

- Explain that small, frequent meals tend to decrease the amount of energy needed for digestion while providing adequate nutrition.
- Help patient develop a positive outlook focused on strengths, abilities, and interests.

Managing Fluid Volume

- Administer diuretics early in the morning so that diuresis does not disturb nighttime rest.
- Monitor fluid status closely: Auscultate lungs, compare daily body weights, and monitor intake and output.
- Teach patient to adhere to a low-sodium diet by reading food labels and avoiding commercially prepared convenience foods.
- Assist patient to adhere to any fluid restriction by planning the fluid distribution throughout the day while maintaining dietary preferences.
- Monitor IV fluids closely; contact physician or pharmacist about the possibility of double-concentrating any medications.
- Position patient, or teach patient how to assume a position, that facilitates breathing (increase number of pillows, elevate the head of bed), or patient may prefer to sit in a comfortable armchair to sleep.
- Assess for skin breakdown, and institute preventive measures (frequent changes of position, positioning to avoid pressure, leg exercises).

Controlling Anxiety

- Decrease anxiety so that patient's cardiac work is also decreased.
- Administer oxygen during the acute stage to diminish the work of breathing and to increase comfort.
- When patient exhibits anxiety, promote physical comfort and psychological support; a family member's presence may provide reassurance; pet visitation or animal-assisted therapy can also be beneficial.
- When patient is comfortable, teach ways to control anxiety and avoid anxiety-provoking situations (relaxation techniques).

- Assist in identifying factors that contribute to anxiety.
- Screen for depression, which often accompanies or results from anxiety.

NURSING ALERT

In cases of confusion and anxiety reactions that affect the patient's safety, the use of restraints should be avoided. Restraints are likely to be resisted, and resistance inevitably increases the cardiac workload.

Minimizing Powerlessness

- Assess for factors contributing to a sense of powerlessness, and intervene accordingly.
- Listen actively to patient often; encourage patient to express concerns and questions.
- Provide patient with decision-making opportunities with increasing frequency and significance; provide encouragement and praise while identifying patient's progress; assist patient to differentiate between factors that can be controlled and those that cannot.

Monitoring and Managing Potential Complications

Many potential problems associated with HF therapy relate to the use of diuretics:

- Monitor for hypokalemia caused by diuresis (potassium depletion). Signs are ventricular dysrhythmias, hypotension, muscle weakness, and generalized weakness.
- Monitor for hyperkalemia, especially with the use of ACE inhibitors, ARBs, or spironolactone.
- Hyponatremia (deficiency of sodium in the blood) can occur, which results in disorientation, apprehension, weakness, fatigue, malaise, and muscle cramps.
- Volume depletion from excessive fluid loss may lead to dehydration and hypotension (ACE inhibitors and beta-blockers may contribute to the hypotension).
- Other problems associated with diuretics include increased serum creatinine and hyperuricemia (excessive uric acid in the blood) that leads to gout.

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE

- Provide patient education, and involve patient in implementing the therapeutic regimen to promote understanding and compliance.
- Support patient and family, and encourage them to ask questions so that information can be clarified and understanding enhanced.
- Adapt teaching plan according to cultural factors.
- Teach patients and family how the progression of the disease is influenced by compliance with the treatment plan.

CONTINUING CARE

- Refer patient for home care if indicated (elderly patients or patients who have long-standing heart disease and whose physical stamina is compromised). The home care nurse assesses the physical environment of the home and the patient's support system and suggests adaptations in the home to meet patient's activity limitations.
- Assess the physical environment of the home and makes suggestions for adapting the home environment to meet the patient's activity limitations.
- Reinforce and clarify information about dietary changes and fluid restrictions, the need to monitor symptoms and daily body weights, and the importance of obtaining follow-up health care.
- Encourage patient to increase self-care and responsibility for accomplishing the daily requirements of the therapeutic regimen.
- Refer to an HF clinic if necessary.

Evaluation

Expected Patient Outcomes

- Demonstrates tolerance for increased activity
- Maintains fluid balance
- Experiences less anxiety
- Makes sound decisions regarding care and treatment
- Adheres to self-care regimen

For more information, see Chapter 30 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Hemophilia

Hemophilia is a relatively rare disease. There are two hereditary bleeding disorders that are clinically indistinguishable but can be separated by laboratory tests: hemophilia A and hemophilia B. Hemophilia A is due to a genetic defect that results in deficient or defective factor VIII. Hemophilia B stems from a genetic defect that causes deficient or defective factor IX. Hemophilia A is about three times more common than hemophilia B. Both types are inherited as X-linked traits, so almost all affected people are males; females can be carriers but are almost always asymptomatic. All ethnic groups are affected. The disease is usually recognized in early childhood, usually in toddlers. Mild hemophilia may not be diagnosed until trauma or surgery.

Clinical Manifestations

The frequency and severity of bleeding depend on the degree of factor deficiency and the intensity of trauma.

- Hemorrhage occurs into various body parts (large, spreading bruises and bleeding into muscles, joints, and soft tissues) after even minimal trauma.
- Most bleeding occurs in joints (most often in knees, elbows, ankles, shoulders, wrists, and hips); pain in joints may occur before swelling and limitation of motion are apparent.
- Chronic pain or ankylosis (fixation) of the joint may occur with recurrent hemorrhage; many patients are crippled by joint damage before adulthood.
- Spontaneous hematuria and gastrointestinal bleeding can occur. Hematomas within the muscle can cause peripheral nerve compression with decreased sensation, weakness, and atrophy of the area.
- The most dangerous site of hemorrhage is in the head (intracranial or extracranial); any head trauma requires prompt evaluation and treatment.

- Surgical procedures typically result in excessive bleeding at the surgical site; bleeding is most commonly associated with dental extraction.

Assessment and Diagnostic Methods

Laboratory tests include clotting factor measurement and CBC count.

Medical Management

- Factors VIII and IX concentrates are given when active bleeding occurs or as a preventive measure before traumatic procedures (eg, lumbar puncture, dental extraction, surgery).
- Plasmapheresis or concurrent immunosuppressive therapy may be required for patients who develop antibodies (inhibitors) to factor concentrates.
- Aminocaproic acid may slow the dissolution of blood clots; desmopressin acetate (DDAVP) induces transient increase in factor VIII.
- Desmopressin is useful for patients with mild forms of hemophilia A.

Nursing Management

- Assist family and patient in coping with the condition because it is chronic, places restrictions on their lives, and is an inherited disorder that can be passed to future generations.
- From childhood, help patients to cope with the disease and to identify the positive aspects of their lives.
- Encourage patients to be self-sufficient and to maintain independence by preventing unnecessary trauma.
- Patients with mild factor deficiency that were not diagnosed until adulthood need extensive teaching about activity restrictions and self-care measures to diminish the chance of hemorrhage and complications of bleeding; emphasize safety at home and in the workplace.
- Instruct patients to avoid any agents that interfere with platelet aggregation, such as aspirin, nonsteroidal anti-inflammatory drugs (NSAIDs), herbs, nutritional supplements, and alcohol. (Also applies to over-the-counter medications such as cold remedies.)

- Promote good dental hygiene as a preventive measure because dental extractions are hazardous.
- Instruct patient that applying pressure to a minor wound may be sufficient to control bleeding if the factor deficiency is not severe; avoid nasal packing.
- Splints and other orthopedic devices may be useful in patients with joint or muscle hemorrhages.
- Avoid all injections; minimize invasive procedures (eg, endoscopy, lumbar puncture) or perform after administration of appropriate factor replacement.
- Carefully assess bleeding during hemorrhagic episodes; patients at risk for significant compromise (eg, bleeding into the respiratory tract or brain) warrant close observation and systematic assessment for emergent complications (eg, respiratory distress, altered LOC).
- If patient has had recent surgery, frequently and carefully assess the surgical site for bleeding; frequent monitoring of vital signs is needed until the nurse is certain that there is no excessive postoperative bleeding.
- Administer analgesics as required; allow warm baths but avoid during bleeding episodes.
- Patients who have been exposed to infections (eg, HIV infection, hepatitis) through previous transfusions may need assistance in coping with the diagnosis and consequences.
- Recommend genetic testing and counseling to female carriers so that they can make informed decisions regarding having children and managing pregnancy.
- Advise patient to carry or wear medical identification.

For more information, see Chapter 33 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Hepatic Encephalopathy and Hepatic Coma

Hepatic encephalopathy, or portosystemic encephalopathy (PSE), is a life-threatening complication of liver disease that occurs with profound liver failure. Ammonia is considered the

major etiologic factor in the development of encephalopathy. Patients have no overt signs but do have abnormalities on neuropsychologic testing. Hepatic encephalopathy is the neuropsychiatric manifestation of hepatic failure associated with portal hypertension and the shunting of blood from the portal venous system into the systemic circulation. Circumstances that increase serum ammonia levels precipitate or aggravate hepatic encephalopathy, such as digestion of dietary and blood proteins and ingestion of ammonium salts. Other factors that may cause hepatic encephalopathy include excessive diuresis, dehydration, infections, fever, surgery, some medications, and, additionally, elevated levels of serum manganese and changes in the types of circulating amino acids, mercaptans, and levels of dopamine and other neurotransmitters in the central nervous system.

Clinical Manifestations

- Earliest symptoms of hepatic encephalopathy include minor mental changes and motor disturbances. Slight confusion and alterations in mood occur; the patient becomes unkempt, experiences disturbed sleep patterns, and tends to sleep during the day and to experience restlessness and insomnia at night.
- With progression, patient may be difficult to awaken and be completely disoriented with respect to time and place; with further progression, the patient lapses into frank coma and may have seizures.
- Asterixis (flapping tremor of the hands) may occur. Simple tasks, such as handwriting, become difficult.
- In early stages, patient's reflexes are hyperactive; with worsening encephalopathy, reflexes disappear and extremities become flaccid.
- Occasionally fetor hepaticus, a characteristic breath odor like freshly mowed grass, acetone, or old wine, may be noticed.

Assessment and Diagnostic Findings

- Electroencephalogram (EEG) shows generalized slowing, an increase in the amplitude of brain waves, and characteristic triphasic waves.

- Serum ammonia measurements are evaluated.
- Assess symptoms in a susceptible patient: daily handwriting or drawing sample; constructional apraxia reveals progression.

Medical Management

- Administer lactulose (Cephulac) to reduce serum ammonia level. Observe for watery diarrheal stools, which indicate lactulose overdose; monitor for hypokalemia and dehydration.
- Administer IV glucose to minimize protein breakdown and vitamins to correct deficiencies, correct electrolyte imbalances (especially potassium), and administer antibiotics if needed.
- Assess neurologic and mental status.
- Record fluid intake and output and body weight daily; vital signs every 4 hours.
- Assess potential sites of infection; report abnormal findings promptly.
- Monitor serum ammonia level daily.
- Moderately restrict protein intake in patients who are comatose or who have encephalopathy that is refractory to lactulose and antibiotic therapy.
- Give enema as prescribed to reduce ammonia absorption from the gastrointestinal tract.
- Discontinue medications that may precipitate encephalopathy (eg, sedative medications, tranquilizers, analgesic agents).
- Administer benzodiazepine antagonists (flumazenil).

Nursing Management

- Maintain a safe environment to prevent bleeding, injury, and infection.
- Administer the prescribed treatments and monitor the patient for the numerous potential complications.
- Encourage deep breathing and position changes to prevent the development of atelectasis, pneumonia, and other respiratory complications.
- Communicate with the patient's family to inform them about the patient's status, and supports them by explaining

the procedures and treatments that are part of the patient's care.

- Instruct family to observe patient for subtle signs of recurrent encephalopathy. Explain that rehabilitation after recovery is likely to be prolonged.
- Instruct in maintenance of moderate-protein, high-calorie diet. Protein may then be added (10-g increments every 3 to 5 days). Reduce if relapse noted.
- Teach how to administer lactulose and monitor for side effects.
- Refer for home care nurse visits to assess patient's physical and mental status and compliance with prescribed therapeutic regimen.
- Emphasize importance of periodic follow-up.

For more information, see Chapter 39 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Hepatic Failure, Fulminant

Fulminant hepatic failure is the clinical syndrome of sudden and severely impaired liver function in a previously healthy person. It is characterized by the development of first symptoms or jaundice within 8 weeks of the onset of disease. Three categories are frequently cited: hyperacute, acute, and subacute. The hepatic lesion is potentially reversible, and survival rates are approximately 20% to 50%, depending greatly on the cause of liver failure. Those who do not survive die of massive hepatocellular injury and necrosis. Viral hepatitis a common cause; other causes include toxic drugs and chemicals, metabolic disturbances, and structural changes.

Clinical Manifestations

- Jaundice and profound anorexia
- Often accompanied by coagulation defects, renal failure and electrolyte disturbances, cardiovascular abnormalities, infection, hypoglycemia, encephalopathy, and cerebral edema

Management

- Liver transplantation (treatment of choice)
- Blood or plasma exchanges
- Liver support systems, such as hepatocytes within synthetic fiber columns, extracorporeal liver assist devices, and bioartificial liver, until transplantation is possible

For more information, see Chapter 39 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Hepatitis, Viral: Types A, B, C, D, E, and G

Hepatitis A

Hepatitis A is caused by an RNA virus of the genus *Enterovirus*. This form of hepatitis is transmitted primarily through the fecal–oral route, by the ingestion of food or liquids infected by the virus. The virus is found in the stool of infected patients before the onset of symptoms and during the first few days of illness. The incubation period is estimated to be 2 to 6 weeks, with a mean of approximately 4 weeks. The course of illness may last 4 to 8 weeks. The virus is present only briefly in the serum; by the time jaundice appears, the patient is likely to be noninfectious. A person who is immune to hepatitis A may contract other forms of hepatitis. Recovery from hepatitis A is usual; it rarely progresses to acute liver necrosis and fulminant hepatitis. No carrier state exists, and no chronic hepatitis is associated with hepatitis A.

Clinical Manifestations

- Many patients are anicteric (without jaundice) and symptomless.
- When symptoms appear, they are of a mild, flulike, upper respiratory infection, with low-grade fever.
- Anorexia is an early symptom and is often severe.
- Later, jaundice and dark urine may be apparent.
- Indigestion is present in varying degrees.

- Liver and spleen are often moderately enlarged for a few days after onset.
- Patient may have an aversion to cigarette smoke and strong odors; symptoms tend to clear when jaundice reaches its peak.
- Symptoms may be mild in children; in adults, they may be more severe, and the course of the disease prolonged.

Assessment and Diagnostic Methods

- Stool analysis for hepatitis A antigen
- Serum hepatitis A virus antibodies; immunoglobulin

Prevention

- Scrupulous hand washing, safe water supply, proper control of sewage disposal.
- Hepatitis vaccine.
- Administration of immune globulin, if not previously vaccinated, to prevent hepatitis A if given within 2 weeks of exposure.
- Immune globulin is recommended for household members and for those who are in sexual contact with people with hepatitis A.
- Preexposure prophylaxis is recommended for those traveling to developing countries or settings with poor or uncertain sanitation conditions who do not have sufficient time to acquire protection by administration of hepatitis A vaccine.

Management

- Bed rest during the acute stage; encourage a nutritious diet.
- Give small, frequent feedings supplemented by IV glucose if necessary during period of anorexia.
- Promote gradual but progressive ambulation to hasten recovery. Patient is usually managed at home unless symptoms are severe.
- Assist patient and family to cope with the temporary disability and fatigue that are common problems in hepatitis.
- Teach patient and family the indications to seek additional health care if the symptoms persist or worsen.
- Instruct patient and family regarding diet, rest, follow-up blood work, avoidance of alcohol, and sanitation and hygiene measures (hand washing) to prevent spread of disease to other family members.

- Teach patient and family about reducing risk for contracting hepatitis A: good personal hygiene with careful hand washing; environmental sanitation with safe food and water supply and sewage disposal.

Hepatitis B

Hepatitis B virus (HBV) is a DNA virus transmitted primarily through blood. The virus has been found in saliva, semen, and vaginal secretions and can be transmitted through mucous membranes and breaks in the skin. Hepatitis B has a long incubation period (1 to 6 months). It replicates in the liver and remains in the serum for long periods, allowing transmission of the virus. Those at risk include all health care workers, patients in hemodialysis and oncology units, sexually active homosexual and bisexual men, and IV drug users. About 10% of patients progress to a carrier state or develop chronic hepatitis. Hepatitis B remains a major worldwide cause of cirrhosis and hepatocellular carcinoma.

Clinical Manifestations

- Symptoms may be insidious and variable; subclinical episodes frequently occur, fever and respiratory symptoms are rare; some patients have arthralgias and rashes.
- Loss of appetite, dyspepsia, abdominal pain, general aching, malaise, and weakness may occur.
- Jaundice may or may not be evident. With jaundice, there are light-colored stools and dark urine.
- Liver may be tender and enlarged; spleen is enlarged and palpable in a few patients. Posterior cervical lymph nodes may also be enlarged.

Assessment and Diagnostic Findings

Hepatitis B surface antigen appears in blood of up to 90% of patients. Additional antigens help to confirm diagnosis.

Gerontologic Considerations

Elderly patients who contract hepatitis B have a serious risk for severe liver cell necrosis or fulminant hepatic failure. Because the patient is seriously ill and the prognosis is poor, efforts should be undertaken to eliminate other factors (eg, medications, alcohol) that may affect liver function.

Prevention

- Screening of blood donors
- Good personal hygiene
- Education
- Hepatitis B vaccine

Medical Management

- Alpha-interferon has shown promising results.
- Lamivudine (Epivir) and adefovir (Hepsera).
- Bed rest and restriction of activities until hepatic enlargement and elevation of serum bilirubin and liver enzymes have disappeared.
- Maintain adequate nutrition; restrict proteins when the ability of the liver to metabolize protein byproducts is impaired.
- Administer antacids and antiemetics for dyspepsia and general malaise; avoid all medications if patient is vomiting.
- Provide hospitalization and fluid therapy if vomiting persists.

Nursing Management

- Convalescence may be prolonged and recovery may take 3 to 4 months; encourage gradual activity after complete clearing of jaundice.
- Identifies psychosocial issues and concerns, particularly the effects of separation from family and friends if the patient is hospitalized; if not hospitalized, the patient will be unable to work and must avoid sexual contact.
- Include family in planning to help reduce their fears and anxieties about the spread of the disease.
- Educate patient and family in home care and convalescence.
- Instruct patient and family to provide adequate rest and nutrition.
- Inform family and intimate friends about risks of contracting hepatitis B.
- Arrange for family and intimate friends to receive hepatitis B vaccine or hepatitis B immune globulin as prescribed.
- Caution patient to avoid drinking alcohol and eating raw shellfish.
- Inform family that follow-up home visits by home care nurse are indicated to assess progress and understanding, reinforce teaching, and answer questions.

- Encourage patient to use strategies to prevent exchange of body fluids, such as avoiding sexual intercourse or using condoms.
- Emphasize importance of keeping follow-up appointments and participating in other health promotion activities and recommended health screenings.

Hepatitis C

A significant portion of cases of viral hepatitis are not A, B, or D; they are classified as hepatitis C. It is the primary form of hepatitis associated with parenteral means (sharing contaminated needles, needlesticks or injuries to health care workers, blood transfusions) or sexual contact. The incubation period is variable and may range from 15 to 160 days. The clinical course of hepatitis C is similar to that of hepatitis B; symptoms are usually mild. A chronic carrier state occurs frequently. There is an increased risk for cirrhosis and liver cancer after hepatitis C. A combination therapy using ribavirin (Rebetol) and interferon (Intron-A) is effective for treating patients with hepatitis C and in treating relapses.

Hepatitis D

Hepatitis D (delta agent) occurs in some cases of hepatitis B. Because the virus requires hepatitis B surface antigen for its replication, only patients with hepatitis B are at risk. It is common in IV drug users, hemodialysis patients, and recipients of multiple blood transfusions. Sexual contact is an important mode of transmission of hepatitis B and D. Incubation varies between 30 and 150 days. The symptoms are similar to those of hepatitis B except that patients are more likely to have fulminant hepatitis and progress to chronic active hepatitis and cirrhosis. Treatment is similar to that for other forms of hepatitis.

Hepatitis E

The hepatitis E virus is transmitted by the fecal–oral route, principally through contaminated water and poor sanitation. Incubation is variable and is estimated to range between 15 and 65 days. In general, hepatitis E resembles hepatitis A. It has a self-limited course with an abrupt onset. Jaundice is almost always present. Chronic forms do not develop. The

major method of prevention is avoiding contact with the virus through hygiene (hand washing). The effectiveness of immune globulin in protecting against hepatitis E virus is uncertain.

Hepatitis G

Hepatitis G (the latest form) is a posttransfusion hepatitis with an incubation period of 14 to 145 days. Autoantibodies are absent. The risk factors are similar to those for hepatitis C.

For more information, see Chapter 39 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Hiatal Hernia

In a hiatal (hiatus) hernia, the opening in the diaphragm through which the esophagus passes becomes enlarged, and part of the upper stomach tends to move up into the lower portion of the thorax. There are two types of hernias: sliding and paraesophageal. Sliding, or type I, hiatal hernia occurs when the upper stomach and the gastroesophageal junction are displaced upward and slide in and out of the thorax; this occurs in about 90% of patients with esophageal hiatal hernias. The less frequent paraesophageal hernias are classified by extent of herniation (type II, III, or IV) and occur when all or part of the stomach pushes through the diaphragm beside the esophagus. Hiatal hernia occurs more often in women than men.

Clinical Manifestations

Sliding Hernia

- Heartburn, regurgitation, and dysphagia; at least half of cases are asymptomatic
- Often implicated in reflux

Paraesophageal Hernia

- Sense of fullness or chest pain after eating or may be asymptomatic.
- Reflux does not usually occur.

- Complications of hemorrhage, obstruction, and strangulation possible.

Assessment and Diagnostic Methods

Diagnosis is confirmed by x-ray studies, barium swallow, and fluoroscopy.

Medical Management

- Frequent, small feedings that easily pass through the esophagus are given.
- Advise patient not to recline for 1 hour after eating (prevents reflux or hernia movement).
- Elevate the head of bed on 4- to 8-in blocks to prevent hernia from sliding upward.
- Surgery is indicated in about 15% of patients; paraesophageal hernias may require emergency surgery.
- Medical and surgical management of paraesophageal hernias is similar to that for gastroesophageal reflux: antacids, histamine blockers, gastric acid pump inhibitors, or prokinetic agents (metoclopramide [Reglan], cisapride [Propulsid]).

NURSING PROCESS

The Patient with an Esophageal Condition and Reflux

Assessment

- Take a complete health history, including pain assessment and nutrition assessment.
- Determine if patient appears emaciated.
- Auscultate chest to determine presence of pulmonary complications.

Diagnosis

Nursing Diagnoses

- Imbalanced nutrition: less than body requirements related to difficulty swallowing
- Risk for aspiration due to difficulty swallowing or tube feeding
- Acute pain related to difficulty swallowing, ingestion of abrasive agent, a tumor, or reflux

- Deficient knowledge about the esophageal disorder, diagnostic studies, treatments, and rehabilitation

Planning and Goals

Major goals may include adequate nutritional intake, avoidance of respiratory compromise from aspiration, relief of pain, and increased knowledge level.

Nursing Interventions

Encouraging Adequate Nutritional Intake

- Encourage patient to eat slowly and chew all food thoroughly.
- Recommend small, frequent feedings of nonirritating foods; sometimes drinking liquids with food helps passage.
- Prepare food in an appealing manner to help stimulate appetite; avoid irritants (tobacco, alcohol).
- Obtain a baseline weight, and record daily weights; assess nutrient intake.

Decreasing Risk of Aspiration

- If patient has difficulty swallowing or handling secretions, keep him or her in at least a semi-Fowler's position.
- Instruct patient in the use of oral suction to decrease risk of aspiration.

Relieving Pain

- Teach patient to eat small meals frequently (six to eight daily).
- Advise patient to avoid any activities that increase pain and to remain upright for 1 to 4 hours after each meal to prevent reflux.
- Elevate the head of bed on 4- to 8-in blocks; discourage eating before bed.
- Advise patient not to use over-the-counter antacids because of possible rebound acidity.
- Instruct in use of prescribed antacids or histamine antagonists.

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE

- Help patient plan for needed physical and psychological adjustments and follow-up care if condition is chronic.

- Teach patient and family to use special equipment (enteral or parenteral feeding devices, suction).
- Help in planning meals, using medications as prescribed, and resuming activity.
- Educate about nutritional requirements and how to measure the adequacy of nutrition (particularly in elderly and debilitated patients). See "Nursing Management" under the "Preoperative and Postoperative Patient" in Chapter P for additional information.

CONTINUING CARE

- Arrange for home health care nursing support and assessment when indicated.
- Teach patient to prepare blenderized or soft food if indicated.
- Assist patient to adjust medication schedule to daily activities when possible.
- Arrange for nutritionist, social worker, or hospice care when indicated.

Evaluation

Expected Patient Outcomes

- Achieves an adequate nutritional intake
- Does not aspirate or develop pneumonia
- Is free of pain or able to control pain within a tolerable level
- Increases knowledge level of esophageal condition, treatment, and prognosis

For more information, see Chapter 35 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Hodgkin's Disease

Hodgkin's disease is a rare cancer of unknown cause that is unicentric in origin and spreads along the lymphatic system. There is a familial pattern associated with Hodgkin's as well as an association with the Epstein–Barr virus. It is somewhat more common in men and tends to peak in the early 20s and

after 50s. The Reed–Sternberg cell, a gigantic morphologically unique tumor cell that is thought to be of immature lymphoid origin, is the pathologic hallmark and essential diagnostic criterion for Hodgkin's disease. Most patients with Hodgkin's disease have the types currently designated "nodular sclerosis" or "mixed cellularity." The nodular sclerosis type tends to occur more often in young women and at an earlier stage but has a worse prognosis than the mixed cellularity subgroup, which occurs more commonly in men and causes more constitutional symptoms but has a better prognosis.

Clinical Manifestations

- Painless enlargement of the lymph nodes on one side of the neck. Individual nodes are firm and painless; common sites are the cervical, supraclavicular, and mediastinal nodes.
- Mediastinal lymph nodes may be visible on x-ray films and large enough to compress the trachea and cause dyspnea.
- Pruritus is common and can be distressing; the cause is unknown. Herpes zoster infection is common.
- Some patients experience brief but severe pain after drinking alcohol, usually at the site of the tumor.
- Symptoms may result from the tumor compressing other organs, causing cough and pulmonary effusion (from pulmonary infiltrates), jaundice (from hepatic involvement or bile duct obstruction), abdominal pain (from splenomegaly or retroperitoneal adenopathy), or bone pain (from skeletal involvement).
- Constitutional symptoms, for prognostic purposes referred to as B symptoms, include fever (without chills), drenching sweats (particularly at night), and unintentional weight loss of more than 10% of body weight (found in 40% of patients and more common in advanced disease).
- Mild anemia develops; leukocyte count may be elevated or decreased, platelet count is typically normal, unless the tumor has invaded the bone marrow, suppressing hematopoiesis; impaired cellular immunity (evidenced by an absence of or decreased response to skin sensitivity tests such as candidal infection, mumps) may be noted.

Assessment and Diagnostic Methods

- Because many manifestations are similar to those occurring with infection, diagnostic studies are performed to rule out an infectious origin for the disease.
- Diagnosis is made by means of an excisional lymph node biopsy and the finding of the Reed–Sternberg cell.
- Assessment for any "B symptoms"; physical examination to evaluate the lymph node chains, as well as the size of the spleen and liver.
- Chest x-ray and a CT scan of the chest, abdomen, and pelvis; positron emission tomography (PET) scan to identify residual disease.
- Laboratory tests: CBC count, platelet count, ESR, and liver and renal function studies.
- Bone marrow biopsy and sometimes bilateral biopsies.
- Bone scans may be performed.

Medical Management

Treatment is determined by the stage of the disease instead of the histologic type.

- Chemotherapy followed by radiation therapy is used in early-stage disease.
- Combination chemotherapy with doxorubicin (Adriamycin), bleomycin (Blenoxane), vinblastine (Velban), and dacarbazine (DTIC), referred to as ABVD, is often considered the standard treatment for more advanced disease.
- Chemotherapy is often successful in obtaining remission even when relapse occurs. Transplant is used for t advanced or refractory disease.

Nursing Management

See "Nursing Management" under "Cancer" for additional information about nursing interventions for patients undergoing chemotherapy and radiation treatments.

- Address the potential development of a second malignancy with the patient when treatment decisions are made; it is also important to tell patients that Hodgkin's lymphoma is often curable.
- Encourage patients to reduce other factors that increase the risk of developing second cancers, such as use of tobacco and

alcohol and exposure to environmental carcinogens and excessive sunlight.
- Screen for late effects of treatment (eg, immune dysfunction, herpes infections [zoster and varicella]; pneumococcal sepsis).
- Provide education about relevant self-care strategies and disease management.

For more information, see Chapter 33 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Huntington Disease

Huntington disease is a chronic, progressive hereditary disease of the nervous system that results in progressive involuntary choreiform (dancelike) movements and dementia. Researchers believe that glutamine abnormally collects in certain brain cell nuclei, causing cell death. Huntington disease affects men and women of all races. It is transmitted as an autosomal dominant genetic disorder; therefore, each child of a parent with Huntington disease has a 50% risk of inheriting the illness. Onset usually occurs between 35 and 45 years of age.

Clinical Manifestations

- The most prominent clinical features are abnormal involuntary movements (chorea), intellectual decline, and, often, emotional disturbance.
- Constant writhing, twisting, and uncontrollable movements of the entire body occur as the disease progresses.
- Facial movements produce tics and grimaces; speech becomes slurred, hesitant, often explosive, and then eventually unintelligible.
- Chewing and swallowing are difficult, and aspiration and choking are dangers.
- Gait becomes disorganized, and ambulation is eventually impossible; patient is eventually confined to a wheelchair.
- Bowel and bladder control is lost.
- Progressive intellectual impairment occurs with eventual dementia.

- Personality changes may result in nervous, irritable, or impatient behaviors. During the early stages of illness: uncontrollable fits of anger; profound, often suicidal depression; apathy; anxiety; psychosis; or euphoria.
- Hallucinations, delusions, and paranoid thinking may precede appearance of disjointed movements.
- Patient dies in 10 to 20 years from HF, pneumonia, or infection or as a result of a fall or choking.

Assessment and Diagnostic Findings

- Diagnosis is made based on the clinical presentation of characteristic symptoms, a positive family history, the known presence of a genetic marker, and exclusion of other causes.
- A genetic marker for Huntington disease has been located. It offers no hope of cure or even specific determination of onset.

Medical Management

No treatment stops or reverses the process; palliative care is given.

- Thiothixene hydrochloride (Navane) and haloperidol decanoate (Haldol), which predominantly block dopamine receptors, improve the chorea in many patients; antiparkinson medications, such as levodopa (Larodopa), may provide temporary benefit to patients who present with rigidity.
- Motor signs are continually assessed and evaluated. Akathisia (motor restlessness) in the overmedicated patient is dangerous and should be reported.
- Psychotherapy aimed at allaying anxiety and reducing stress may be beneficial; antidepressants are given for depression or suicidal ideation; psychotic symptoms usually respond to antipsychotic medications.
- Patient's needs and capabilities are the focus of treatment.

Nursing Management

- Teach patient and family about medications, including signs indicating need for change in dosage or medication.
- Address strategies to manage symptoms (chorea, swallowing problems, ambulation problems, or altered bowel or bladder function).

- Arrange for consultation with a speech therapist, if needed.
- Provide supportive care, as Huntington's exacts enormous emotional, physical, social, and financial tolls on every member of the patient's family.
- Emphasize the need for regular follow-up.
- Refer for home care nursing assistance, respite care, day care centers, and eventually skilled long-term care to assist patient and family to cope.
- Provide information about the Huntington's Disease Society of America, which gives information, referrals, education, and support for research.

For more information, see Chapter 65 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Hyperglycemic Hyperosmolar Nonketotic Syndrome

Hyperglycemic hyperosmolar nonketotic syndrome (HHNS) is a serious condition in which hyperglycemia and hyperosmolarity predominate with alterations of the sensorium (sense of awareness). Ketosis is minimal or absent. The basic biochemical defect is lack of effective insulin (insulin resistance).

Pathophysiology

Persistent hyperglycemia causes osmotic diuresis, resulting in water and electrolyte losses. Although there is not enough insulin to prevent hyperglycemia, the small amount of insulin present is enough to prevent fat breakdown. This condition occurs most frequently in older people (50 to 70 years of age) who have no known history of diabetes or who have type 2 diabetes. The acute development of the condition can be traced to some precipitating event, such as an acute illness (eg, pneumonia, cerebrovascular accident [CVA]), medications (eg, thiazides) that exacerbate hyperglycemia, or treatments such as dialysis.

Clinical Manifestations

- History of days to weeks of polyuria with adequate fluid intake
- Hypotension, tachycardia
- Profound dehydration (dry mucous membranes, poor skin turgor)
- Variable neurologic signs (alterations of sensorium, seizures, hemiparesis)

Assessment and Diagnostic Methods

- Laboratory tests, including blood glucose, electrolytes, BUN, CBC count, serum osmolality, and ABGs
- Clinical picture of severe dehydration

Medical Management

The overall treatment of HHNS is similar to that of diabetic ketoacidosis (DKA): fluids, electrolytes, and insulin.

- Start fluid treatment with 0.9% or 0.45% normal saline, depending on sodium level and severity of volume depletion.
- Central venous or hemodynamic pressure monitoring may be necessary to guide fluid replacement.
- Add potassium to replacement fluids when urinary output is adequate; guided by continuous ECG monitoring and laboratory determinations of potassium.
- Insulin is usually given at a continuous low rate to treat hyperglycemia.
- Dextrose is added to replacement fluids when the glucose level decreases to 250 to 300 mg/dL.
- Other therapeutic modalities are determined by the underlying illness and results of continuing clinical and laboratory evaluation.
- Treatment is continued until metabolic abnormalities are corrected and neurologic symptoms clear (may take 3 to 5 days for neurologic symptoms to resolve).

Nursing Management

See "Nursing Management" under "Diabetes Mellitus" and "Diabetic Ketoacidosis" for additional information.

- Assess vital signs, fluid status, and laboratory values. Fluid status and urine output are closely monitored because of

the high risk of renal failure secondary to severe dehydration.
- Because HHNS tends to occur in older patients, the physiologic changes that occur with aging should be considered.
- Careful assessment of cardiovascular, pulmonary, and renal function throughout the acute and recovery phases of HHNS is important.

For more information, see Chapter 41 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Hypertension (and Hypertensive Crisis)

Hypertension is defined as a systolic blood pressure greater than 140 mm Hg and a diastolic pressure greater than 90 mm Hg, based on two or more measurements. Hypertension can be classified as follows:

- Normal: systolic less than 120 mm Hg; diastolic less than 80 mm Hg
- Prehypertension: systolic 120 to 139 mm Hg; diastolic 80 to 89 mm Hg
- Stage 1: systolic 140 to 159 mm Hg; diastolic 90 to 99 mm Hg
- Stage 2: systolic ≥160 mm Hg; diastolic ≥100 mm Hg

Hypertension is a major risk factor for atherosclerotic cardiovascular disease, HF, stroke, and kidney failure. Hypertension carries the risk for premature morbidity or mortality, which increases as systolic and diastolic pressures rise. Prolonged blood pressure elevation damages blood vessels in target organs (heart, kidneys, brain, and eyes).

Essential (Primary) Hypertension

In the adult population with hypertension, between 90% and 95% have essential (primary) hypertension, which has no identifiable medical cause; it appears to be a multifactorial, polygenic condition. For high blood pressure to occur, an increase in peripheral resistance and/or cardiac output must occur secondary to increased sympathetic stimulation, increased renal

BOX H-1 ***Emergency! Hypertensive Crisis***

Hypertensive crisis, or hypertensive emergency, exists when an elevated blood pressure level must be lowered immediately (not necessarily to less than 140/90 mm Hg) to halt or prevent target organ damage. Hypertensive urgency exists when blood pressure is very elevated but there is no evidence of impending or progressive target organ damage. Oral agents (beta-adrenergic blocking agents [eg, labetalol], ACE inhibitors [eg, captopril], or $alpha_2$-agonists [eg, clonidine] can be administered with the goal of normalizing blood pressure within 24 to 48 hours. Close hemodynamic monitoring of the patient's blood pressure and cardiovascular status is required. Vital signs should be checked as often as every 5 minutes.

sodium reabsorption, increased renin–angiotensin–aldosterone system activity, decreased vasodilation of the arterioles, or resistance to insulin action.

Hypertensive emergencies and urgencies may occur in patients whose hypertension has been poorly controlled, whose hypertension has been undiagnosed, or in those who have abruptly discontinued their medications (see Box H-1).

Secondary Hypertension

Secondary hypertension is characterized by elevations in blood pressure with a specific cause, such as narrowing of the renal arteries, renal parenchymal disease, hyperaldosteronism (mineralocorticoid hypertension), certain medications, pregnancy, and coarctation of the aorta. Hypertension can also be acute, a sign of an underlying condition that causes a change in peripheral resistance or cardiac output.

Clinical Manifestations

- Physical examination may reveal no abnormality other than high blood pressure.
- Changes in the retinas with hemorrhages, exudates, narrowed arterioles, and cotton–wool spots (small infarctions), and papilledema may be seen in severe hypertension.

- Symptoms usually indicate vascular damage related to organ systems served by involved vessels.
- Coronary artery disease with angina or myocardial infarction is the most common consequence.
- Left ventricular hypertrophy may occur; HF ensues.
- Pathologic changes may occur in the kidney (nocturia and increased BUN and creatinine levels).
- Cerebrovascular involvement may occur (stroke or transient ischemic attack [TIA] [ie, alterations in vision or speech, dizziness, weakness, a sudden fall, or transient or permanent hemiplegia]).

Assessment and Diagnostic Methods

- History and physical examination, including retinal examination; laboratory studies for organ damage, including urinalysis, blood chemistry (sodium, potassium, creatinine, fasting glucose, total and high-density lipoprotein); ECG; and echocardiography to assess left ventricular hypertrophy.
- Additional studies, such as creatinine clearance, renin level, urine tests, and 24-hour urine protein, may be performed.

Medical Management

The goal of any treatment program is to prevent death and complications by achieving and maintaining an arterial blood pressure at or below 140/90 mm Hg (130/80 mm Hg for people with diabetes mellitus or chronic kidney disease), whenever possible.

- Nonpharmacologic approaches include weight reduction; restriction of alcohol and sodium; regular exercise and relaxation. A DASH (Dietary Approaches to Stop Hypertension) diet high in fruits, vegetables, and low-fat dairy products has been shown to lower elevated pressures.
- Select a drug class that has the greatest effectiveness, fewest side effects, and best chance of acceptance by patient. Two classes of drugs are available as first-line therapy: diuretics and beta-blockers.
- Promote compliance by avoiding complicated drug schedules.

NURSING PROCESS

The Patient with Hypertension

Assessment

- Assess blood pressure at frequent intervals; know baseline level. Note changes in pressure that would require a change in medication.
- Assess for signs and symptoms that indicate target organ damage (eg, anginal pain; shortness of breath; alterations in speech, vision, or balance; nosebleeds; headaches; dizziness; or nocturia).
- Note the apical and peripheral pulse rate, rhythm, and character.
- Assess extent to which hypertension has affected patient personally, socially, or financially.

Diagnosis

Nursing Diagnoses

- Deficient knowledge regarding the relationship between the treatment regimen and control of the disease process
- Noncompliance with therapeutic regimen related to side effects of prescribed therapy

Collaborative Problems/Potential Complications

- Left ventricular hypertrophy
- Myocardial infarction
- HF
- TIA
- CVA
- Renal insufficiency and failure
- Retinal hemorrhage

Planning and Goals

The major goals for the patient include understanding of the disease process and its treatment, participation in a self-care program, and absence of complications.

Nursing Interventions

Increasing Knowledge

- Emphasize the concept of controlling hypertension (with lifestyle changes and medications) rather than curing it.

- Arrange a consultation with a dietitian to help develop a plan for improving nutrient intake or for weight loss.
- Advise patient to limit alcohol intake and avoid use of tobacco.
- Recommend support groups for weight control, smoking cessation, and stress reduction, if necessary.
- Assist the patient to develop and adhere to an appropriate exercise regimen.

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE

- Help the patient achieve blood pressure control through education about managing blood pressure, setting goal blood pressures, and providing assistance with social support; encourage family members to support the patient's efforts to control hypertension.
- Provide written information about the expected effects and side effects of medications; ensure patient understands importance of reporting side effects (and to whom) when they occur.
- Inform patient that rebound hypertension can occur if antihypertensive medications are suddenly stopped; advise patient to have an adequate supply of medication.
- Inform patients that some medications, such as beta-blockers, may cause sexual dysfunction and that other medications are available if problems occur.
- Encourage and teach patient to measure their blood pressure at home; inform patient that blood pressure varies continuously and that the range within which their pressure varies should be monitored.

Gerontologic Considerations

Compliance with the therapeutic program may be more difficult for elderly people. The medication regimen can be difficult to remember, and the expense can be a problem. Monotherapy (treatment with a single agent), if appropriate, may simplify the medication regimen and make it less expensive.

- Ensure that the elderly patient understands the regimen and can see and read instructions, open the medication container, and get the prescription refilled.

- Include family members or caregivers in the teaching program so that they understand the patient's needs, can encourage adherence to the treatment plan, and know when and whom to call if problems arise or information is needed.

CONTINUING CARE

- Reinforce importance of regular follow-up care.
- Obtain patient history and perform physical examination at each clinic visit.
- Assess for medication-related problems (orthostatic hypotension).
- Provide continued education and encouragement to enable patients to formulate an acceptable plan that helps them live with their hypertension and adhere to the treatment plan.
- Assist with behavior change by supporting patients in making small changes with each visit that move them toward their goals.

Monitoring and Managing Potential Complications

- Assess all body systems when patient returns for follow-up care to detect any evidence of vascular damage.
- Question patient about blurred vision, spots, or diminished visual acuity.
- Report any significant findings promptly to determine whether additional studies or changes in medications are required.

Evaluation

Expected Patient Outcomes

- Maintains adequate tissue perfusion
- Complies with self-care program
- Experiences no complications

For more information, see Chapter 32 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Also see Chapter 32 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2008). *Brunner and Suddarth's textbook of medical-surgical nursing*. (11th ed.). Philadelphia: Lippincott Williams & Wilkins.

Hyperthyroidism (Graves' Disease)

Hyperthyroidism is the second most common endocrine disorder, and Graves' disease is the most common type. It results from an excessive output of thyroid hormones due to abnormal stimulation of the thyroid gland by circulating immunoglobulins. The disorder affects women eight times more frequently than men and peaks between the second and fourth decades of life. It may appear after an emotional shock, stress, or infection, but the exact significance of these relationships is not understood. Other common causes include thyroiditis and excessive ingestion of thyroid hormone (eg, from the treatment of hypothyroidism).

Clinical Manifestations

Hyperthyroidism presents a characteristic group of signs and symptoms (thyrotoxicosis).

- Nervousness (emotionally hyperexcitable), irritability, apprehensiveness; inability to sit quietly; palpitations; rapid pulse on rest and exertion.
- Poor tolerance of heat; excessive perspiration; skin that is flushed, with a characteristic salmon color, and likely to be warm, soft, and moist.
- Dry skin and diffuse pruritus.
- Fine tremor of the hands.
- Exophthalmos (bulging eyes) in some patients.
- Increased appetite and dietary intake, progressive loss of weight, abnormal muscle fatigability, weakness, amenorrhea, and changes in bowel function (constipation or diarrhea).
- Pulse ranges between 90 and 160 beats per minute; systolic (but not diastolic) blood pressure elevation (increased pulse pressure).
- Atrial fibrillation; cardiac decompensation in the form of congestive HF, especially in the elderly.
- Osteoporosis and fracture.
- Cardiac effects may include sinus tachycardia or dysrhythmias, increased pulse pressure, and palpitations; myocardial hypertrophy and HF may occur if the hyperthyroidism is severe and untreated.

- May include remissions and exacerbations, terminating with spontaneous recovery in a few months or years.
- May progress relentlessly, causing emaciation, intense nervousness, delirium, disorientation, and eventually HF.

Assessment and Diagnostic Findings

- Thyroid gland is enlarged; it is soft and may pulsate; a thrill may be felt and a bruit heard over thyroid arteries.
- Laboratory tests show a decrease in serum TSH, increased free T_4, and an increase in radioactive iodine uptake.

Gerontologic Considerations

Elderly patients commonly present with vague and nonspecific signs and symptoms. The only presenting manifestations may be anorexia and weight loss, absence of ocular signs, or isolated atrial fibrillation. (New or worsening HF or angina is more likely to occur in elderly than in younger patients.) These signs and symptoms may mask the underlying thyroid disease. Spontaneous remission of hyperthyroidism is rare in the elderly. Measurement of TSH uptake is indicated in elderly patients with unexplained physical or mental deterioration. Use of radioactive iodine is generally recommended for treatment of thyrotoxicosis rather than surgery unless an enlarged thyroid gland is pressing on the airway. Thyrotoxicosis must be controlled by medications before radioactive iodine is used because radiation may precipitate thyroid storm, which has a mortality rate of 10% in the elderly. Beta-adrenergic blocking agents may be indicated. Use these agents with extreme caution and monitor closely for granulocytopenia. Modify dosages of other medications because of the altered rate of metabolism in hyperthyroidism.

Medical Management

Treatment is directed toward reducing thyroid hyperactivity to relieve symptoms and preventing complications. Three forms of treatment are available:

- Radioactive iodine therapy for destructive effects on the thyroid gland
- Antithyroid medications
- Surgery with the removal of most of the thyroid gland

Radioactive Iodine (^{131}I)

- ^{131}I is given to destroy the overactive thyroid cells (most common treatment in the elderly).
- ^{131}I is contraindicated in pregnancy and nursing mothers because radioiodine crosses the placenta and is secreted in breast milk.

Antithyroid Medications

- The objective of pharmacotherapy is to inhibit hormone synthesis or release and reduce the amount of thyroid tissue.
- The most commonly used medications are propylthiouracil (Propacil, PTU) and methimazole (Tapazole) until patient is euthyroid.
- Maintenance dose is established, followed by gradual withdrawal of the medication over the next several months.
- Antithyroid drugs are contraindicated in late pregnancy because of a risk for goiter and cretinism in the fetus.
- Thyroid hormone may be administered to put the thyroid to rest.

Adjunctive Therapy

- Potassium iodide, Lugol's solution, and saturated solution of potassium iodide (SSKI) may be added.
- Beta-adrenergic agents may be used to control the sympathetic nervous system effects that occur in hyperthyroidism; for example, propranolol is used for nervousness, tachycardia, tremor, anxiety, and heat intolerance.

Surgical Intervention

- Surgical intervention (reserved for special circumstances) removes about five sixths of the thyroid tissue.
- Surgery to treat hyperthyroidism is performed after thyroid function has returned to normal (4 to 6 weeks).
- Before surgery, patient is given propylthiouracil until signs of hyperthyroidism have disappeared.
- Iodine is prescribed to reduce thyroid size and vascularity and blood loss. Patient is monitored carefully for evidence of iodine toxicity (swelling buccal mucosa, excessive salivation, skin eruptions).

- Risk for relapse and complications necessitates long-term follow-up of patient undergoing treatment of hyperthyroidism.

NURSING PROCESS

The Patient with Hyperthyroidism

Assessment

- Obtain a health history, including family history of hyperthyroidism, and note reports of irritability or increased emotional reaction and the impact of these changes on patient's interaction with family, friends, and coworkers.
- Assess stressors and patient's ability to cope with stress.
- Evaluate nutritional status and presence of symptoms; note excessive nervousness and changes in vision and appearance of eyes.
- Assess and monitor cardiac status periodically (heart rate, blood pressure, heart sounds, and peripheral pulses).
- Assess emotional state and psychological status.

Diagnosis

Nursing Diagnoses

- Imbalanced nutrition: Less than body requirements related to exaggerated metabolic rate, excessive appetite, and increased gastrointestinal activity
- Ineffective coping related to irritability, hyperexcitability, apprehension, and emotional instability
- Low self-esteem related to changes in appearance, excessive appetite, and weight loss
- Altered body temperature

Collaborative Problems/Potential Complications

- Thyrotoxicosis or thyroid storm
- Hypothyroidism

Planning and Goals

Goals of the patient may be improved nutritional status, improved coping ability, improved self-esteem, maintenance of normal body temperature, and absence of complications.

Nursing Interventions

Improving Nutritional Status

- Provide several small, well-balanced meals (up to six meals a day) to satisfy patient's increased appetite.
- Replace food and fluids lost through diarrhea and diaphoresis, and control diarrhea that results from increased peristalsis.
- Reduce diarrhea by avoiding highly seasoned foods and stimulants such as coffee, tea, cola, and alcohol; encourage high-calorie, high-protein foods.
- Provide quiet atmosphere during mealtime to aid digestion.
- Record weight and dietary intake daily.

Enhancing Coping Measures

- Reassure the patient that the emotional reactions being experienced are a result of the disorder and that with effective treatment those symptoms will be controlled.
- Reassure family and friends that symptoms are expected to disappear with treatment.
- Maintain a calm, unhurried approach, and minimize stressful experiences.
- Keep the environment quiet and uncluttered.
- Provide information regarding thyroidectomy and preparatory pharmacotherapy to alleviate anxiety.
- Assist patient to take medications as prescribed and encourage adherence to the therapeutic regimen.
- Repeat information often, and provide written instructions as indicated due to short attention span.

Improving Self-Esteem

- Convey to patient an understanding of concerns regarding problems with appearance, appetite, and weight, and assist in developing coping strategies.
- Provide eye protection if patient experiences eye changes secondary to hyperthyroidism; instruct regarding correct instillation of eyedrops or ointment to soothe the eyes and protect the exposed cornea. Discourage smoking.
- Arrange for patient to eat alone, if desired and if embarrassed by the large meals consumed due to increased metabolic rate. Avoid commenting on intake.

Maintaining Normal Body Temperature

- Provide a cool, comfortable environment and fresh bedding and gown as needed.
- Give cool baths and provide cool fluids; monitor body temperature.

Monitoring and Managing Potential Complications

- Monitor closely for signs and symptoms indicative of thyroid storm.
- Assess cardiac and respiratory function: vital signs, cardiac output, ECG monitoring, ABGs, pulse oximetry.
- Administer oxygen to prevent hypoxia, to improve tissue oxygenation, and to meet the high metabolic demands.
- Give IV fluids to maintain blood glucose levels and replace lost fluids.
- Administer antithyroid medications to reduce thyroid hormone levels.
- Administer propranolol and digitalis to treat cardiac symptoms.
- Implement strategies to treat shock if needed.
- Monitor for hypothyroidism; encourage continued therapy.
- Instruct patient and family about the importance of continuing therapy indefinitely after discharge and about the consequences of failing to take medication.

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE

- Instruct how and when to take prescribed medications.
- Teach patient how the medication regimen fits in with the broader therapeutic plan.
- Provide an individualized written plan of care for use at home.
- Teach patient and family about the desired effects and side effects of medications.
- Instruct patient and family about which adverse effects should be reported to the physician.
- Teach patient about what to expect from a thyroidectomy if this is to be performed.
- Teach patient to avoid situations that have the potential of stimulating thyroid storm.

CONTINUING CARE

- Refer to home care for assessment of the home and family environment.
- Stress long-term follow-up care because of the possibility of hypothyroidism after thyroidectomy or treatment with antithyroid drugs or radioactive iodine.
- Assess for changes indicating return to normal thyroid function; assess for physical signs of hyperthyroidism and hypothyroidism.
- Remind the patient and family about the importance of health promotion activities and recommended health screening.

Evaluation

Expected Patient Outcomes

- Shows improved nutritional status
- Demonstrates effective coping methods in dealing with family, friends, and coworkers
- Achieves increased self-esteem
- Maintains normal body temperature
- Displays absence of complications

For more information, see Chapter 42 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Hypoglycemia (Insulin Reaction)

Hypoglycemia (abnormally low blood glucose level) occurs when the blood glucose falls below 50 to 60 mg/dL. It can be caused by too much insulin or oral hypoglycemic agents, too little food, or excessive physical activity. Hypoglycemia may occur at any time. It often occurs before meals, especially if meals are delayed or if snacks are omitted. Middle-of-the-night hypoglycemia may occur because of peaking evening NPH or Lente insulins, especially in patients who have not eaten a bedtime snack.

Gerontologic Considerations

Elderly people frequently live alone and may not recognize the symptoms of hypoglycemia. With decreasing renal function, it

takes longer for oral hypoglycemic agents to be excreted by the kidneys. Teach patient to avoid skipping meals because of decreased appetite or financial limitations. Decreased visual acuity may lead to errors in insulin administration.

Clinical Manifestations

- The symptoms of hypoglycemia may be grouped into two categories: adrenergic symptoms and central nervous system symptoms.
- Hypoglycemic symptoms may occur suddenly and unexpectedly and vary from person to person.
- Patients who have blood glucose in the hyperglycemic range (200 mg/dL or greater) may feel hypoglycemic with adrenergic symptoms when blood glucose quickly drops to 120 mg/dL (6.6 mmol/L) or less.
- Patients with usual blood glucose levels in the low range of normal may not experience symptoms when blood glucose slowly falls under 50 mg/dL (2.7 mmol/L).
- A decreased hormonal (adrenergic) response to hypoglycemia may occur in patients who have had diabetes for many years. Patient must perform blood glucose checks frequently.
- As the glucose falls, the normal surge of adrenaline does not occur, and patient does not feel the usual adrenergic symptoms (sweating and shakiness).

Mild Hypoglycemia

The sympathetic nervous system is stimulated, producing sweating, tremor, tachycardia, palpitations, nervousness, and hunger.

Moderate Hypoglycemia

Moderate hypoglycemia produces impaired function of the central nervous system, including inability to concentrate, headache, lightheadedness, confusion, memory lapses, numbness of the lips and tongue, slurred speech, impaired coordination, emotional changes, irrational or combative behavior, double vision, and drowsiness, or any combination of these symptoms.

Severe Hypoglycemia

In severe hypoglycemia, central nervous system function is further impaired. The patient needs the assistance of another

for treatment. Symptoms may include disoriented behavior, seizures, difficulty arousing from sleep, or loss of consciousness.

Assessment and Diagnostic Methods

Measurement of serum glucose levels

Medical Management

- The usual recommendation is 15 g of a fast-acting concentrated source of carbohydrate orally (eg, three or four commercially prepared glucose tablets; 4 to 6 oz of fruit juice or regular soda, 6 to 10 hard candies, 2 to 3 tsp of sugar or honey).
- Patient should avoid adding table sugar to juice, even "unsweetened" juice, which may cause a sharp increase in glucose, resulting in hyperglycemia hours later.
- Treatment is repeated if the symptoms persist more than 10 to 15 minutes after initial treatment; patient is retested in 15 minutes and retreated if blood glucose level is less than 70 to 75 mg/dL.
- Patient should eat a snack containing protein and starch (milk, or cheese and crackers) after the symptoms resolve or should eat a meal or snack within 30 to 60 minutes.

Management of Hypoglycemia in the Unconscious Patient

- Glucagon, 1 mg subcutaneously or intramuscularly for patients who cannot swallow, or who refuse treatment; patient may take up to 20 minutes to regain consciousness. Give a concentrated source of carbohydrate followed by snack when awake.
- From 25 to 50 mL of 50% dextrose in water is administered intravenously to patients who are unconscious or unable to swallow (in a hospital setting).

Nursing Management

- Teach patient to prevent hypoglycemia by following a consistent, regular pattern for eating, administering insulin, and exercising. Advise patient to consume between-meal and bedtime snacks to counteract the maximum insulin effect.
- Reinforce that routine blood glucose tests are performed so that changing insulin requirements may be anticipated and the dosage adjusted.

- Encourage patients taking insulin to wear an identification bracelet or tag indicating they have diabetes.
- Instruct patient to notify physician after severe hypoglycemia has occurred.
- Instruct patients and family about symptoms of hypoglycemia and use of glucagon.
- Teach family that hypoglycemia can cause irrational and unintentional behavior.
- Teach patient the importance of performing self-monitoring of blood glucose on a frequent and regular basis.

- Teach patients with type 2 diabetes who take oral sulfonylurea agents that symptoms of hypoglycemia may also develop.
- Patients with diabetes should carry a form of simple sugar with them at all times.
- Patient is discouraged from eating high-calorie, high-fat dessert foods to treat hypoglycemia, because high-fat snacks may slow absorption of the glucose.

For more information, see Chapter 41 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Hypoparathyroidism

The most common cause of hypoparathyroidism is inadequate secretion of parathyroid hormone after interruption of the blood supply or surgical removal of parathyroid gland tissue during thyroidectomy, parathyroidectomy, or radical neck dissection. Atrophy of the parathyroid glands of unknown etiology is a less common cause. Symptoms are due to deficiency of parathormone that results in an elevation of blood phosphate (hyperphosphatemia) and decrease in blood calcium (hypocalcemia) levels.

Clinical Manifestations

- Tetany is the chief symptom.
- Latent tetany: numbness, tingling, and cramps in the extremities; stiffness in the hands and feet.

- Overt tetany: bronchospasm, laryngeal spasm, carpopedal spasm, dysphagia, photophobia, cardiac dysrhythmias, and seizures.
- Other symptoms: anxiety, irritability, depression, and delirium. ECG changes and hypotension may also occur.

Assessment and Diagnostic Findings

- Latent tetany is suggested by a positive Trousseau's sign or a positive Chvostek's sign (tetany noted with serum calcium 5 to 6 mg/dL [1.2 to 1/5 mmol/L] or lower).
- Diagnosis is difficult because of vague symptoms; laboratory studies show increased serum phosphate; x-rays of bone show increased density and calcification of the subcutaneous or paraspinal basal ganglia of the brain.

Medical Management

- Serum calcium level is raised to 9 to 10 mg/dL (2.2 to 2.5 mmol/L).
- When hypocalcemia and tetany occur after thyroidectomy, IV calcium gluconate is given immediately. Sedatives (pentobarbital) may be administered. Parenteral parathormone may be given, watching for an allergic reaction and changes in serum calcium levels.
- Neuromuscular irritability is reduced by providing an environment that is free of noise, drafts, bright lights, or sudden movement.
- Tracheostomy or mechanical ventilation and bronchodilating medications may become necessary if the patient develops respiratory distress.
- Chronic hypoparathyroidism is treated with a diet high in calcium and low in phosphorus. Patient should avoid milk, milk products, egg yolk, and spinach.
- Oral calcium tablets and vitamin D preparations and aluminum hydroxide or aluminum carbonate may be given.

Nursing Management

- Detecting early signs of hypocalcemia and anticipate signs of tetany, seizures, and respiratory difficulties.
- Keep calcium gluconate at the bedside; if patient has a cardiac disorder, is subject to dysrhythmias, or is receiving

digitalis, the calcium gluconate is administered slowly and cautiously.

- Provide continuous cardiac monitoring and careful assessment; calcium and digitalis increase systolic contraction and also potentiate each other; this can produce potentially fatal dysrhythmias.
- Teach patient about medications and diet therapy, the reason for high calcium and low phosphate intake, and the symptoms of hypocalcemia and hypercalcemia.
- Direct patient to contact physician if symptoms occur.

For more information, see Chapter 42 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Hypopituitarism

Hypopituitarism, a hypofunction of the pituitary gland, can result from disease of the pituitary gland itself or disease of the hypothalamus; the result is essentially the same. Hypopituitarism also may result from destruction of the anterior lobe of the pituitary gland and from radiation therapy to the head and neck area. The total destruction of the pituitary gland by trauma, tumor, or vascular lesion removes all stimuli that are normally received by the thyroid, the gonads, and the adrenal glands. The result is extreme weight loss, emaciation, atrophy of all endocrine glands and organs, hair loss, impotence, amenorrhea, hypometabolism, and hypoglycemia. Coma and death occur if the missing hormones are not replaced.

For more information, see Chapter 42 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Hypothyroidism and Myxedema

Hypothyroidism results from suboptimal levels of thyroid hormone. Types of hypothyroidism include primary, which

refers to dysfunction of the thyroid gland (more than 95% of cases); central, due to failure of the pituitary gland, hypothalamus, or both; secondary or pituitary, which is due entirely to a pituitary disorder; and hypothalamic or tertiary, due to a disorder of the hypothalamus resulting in inadequate secretion of TSH from decreased stimulation by thyrotropin-releasing hormone (TRH). Hypothyroidism occurs most often in older women. Its causes include autoimmune thyroiditis (Hashimoto's thyroiditis, most common type in adults); therapy for hyperthyroidism (radioiodine, surgery, or antithyroid drugs); radiation therapy for head and neck cancer; infiltrative diseases of the thyroid (amyloidosis and scleroderma); iodine deficiency; and iodine excess. When thyroid deficiency is present at birth, the condition is known as cretinism. The term "myxedema" refers to the accumulation of mucopolysaccharides in subcutaneous and other interstitial tissue and is used only to describe the extreme symptoms of severe hypothyroidism.

Clinical Manifestations

- Extreme fatigue
- Hair loss, brittle nails, dry skin, and numbness and tingling of fingers
- Husky voice and hoarseness
- Menstrual disturbances (eg, menorrhagia or amenorrhea); loss of libido
- Severe hypothyroidism: subnormal temperature and pulse rate; weight gain without corresponding increase in food intake; cachexia
- Thickened skin, thinning hair or alopecia; expressionless and masklike facial features
- Sensation of cold in a warm environment
- Subdued emotional responses as the condition progresses; dulled mental processes and apathy
- Slowed speech; enlarged tongue, hands, and feet; constipation; possibly deafness
- Advanced hypothyroidism: personality and cognitive changes, pleural effusion, pericardial effusion, and respiratory muscle weakness

- Hypothermia: abnormal sensitivity to sedatives, opiates, and anesthetic agents (these drugs are given with extreme caution)
- Severe hypothyroidism: elevated serum cholesterol level, atherosclerosis, coronary artery disease, and poor left ventricular function
- Myxedema coma (rare)

Gerontologic Considerations

The higher prevalence of hypothyroidism in the elderly population may be related to alterations in immune function with age. Depression, apathy, or decreased mobility or activity may be the major initial symptom. In all patients with hypothyroidism, the effects of analgesic agents, sedatives, and anesthetic agents are prolonged; special caution is necessary in administering these agents to elderly patients because of concurrent changes in liver and renal function. Thyroid hormone replacement must be started with low doses and gradually increased to prevent serious cardiovascular and neurologic side effects, such as angina. Regular testing of serum TSH is recommended for people older than 60 years. Myxedema and myxedema coma generally occur in patients older than 50 years.

NURSING ALERT

Patients with unrecognized hypothyroidism undergoing surgery are at increased risk for intraoperative hypotension, postoperative congestive HF, and altered mental status. Myocardial ischemia or infarction may occur in response to therapy in patients with severe, long-standing hypothyroidism or myxedema coma. Be alert for signs of angina, especially during the early phase of treatment, and discontinue administration of thyroid hormone immediately if symptoms occur.

Medical Management

The primary objective is to restore a normal metabolic state by replacing thyroid hormone. Additional treatment in severe hypothyroidism consists of maintaining vital functions, monitoring ABG values, and administering fluids cautiously because of the danger of water intoxication.

Pharmacologic Therapy

- Synthetic levothyroxine (Synthroid or Levothroid) is the preferred preparation.
- External heat application is avoided because it increases oxygen requirements and may lead to vascular collapse.
- Concentrated glucose may be given if hypoglycemia is evident.
- If myxedema coma is present, thyroid hormone is given intravenously until consciousness is restored.

Interaction of Thyroid Hormones with Other Drugs

- Thyroid hormones increase blood glucose levels, which may necessitate adjustment in doses of insulin or oral hypoglycemic agents.
- Thyroid hormone may increase the pharmacologic effect of digitalis, glycosides, anticoagulants, and indomethacin, requiring careful observation and assessment for side effects of these drugs.
- The effects of thyroid hormone may be increased by phenytoin and tricyclic antidepressants.

NURSING ALERT

Severe untreated hypothyroidism increases susceptibility to all hypnotic and sedative drugs.

Nursing Management

Promoting Home- and Community-Based Care

Teaching Patients Self-Care

- Oral and written instructions should be provided regarding the following:
- Desired actions and side effects of medications
- Correct medication administration
- Importance of continuing to take the medications as prescribed even after symptoms improve
- When to seek medical attention
- Importance of nutrition and diet to promote weight loss and normal bowel patterns
- Importance of periodic follow-up testing

The patient and family should be informed that many of the symptoms observed during the course of the disorder will disappear with effective treatment.

Continuing Care

- Monitor the patient's recovery and ability to cope with the recent changes, along with the patient's physical and cognitive status and the patient's and family's understanding of the instructions provided before hospital discharge.
- Document and report to the patient's primary health care provider subtle signs and symptoms that may indicate either inadequate or excessive thyroid hormone.

For more information, see Chapter 42 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.



Idiopathic Thrombocytopenic Purpura

Idiopathic thrombocytopenic purpura (ITP) is a disease affecting all ages but is more common in children and young women. Although the precise cause remains unknown, viral infection sometimes precedes the disease in children. Other conditions (eg, systemic lupus erythematosus, pregnancy) or medications (eg, sulfa drugs) can also produce ITP. In patients with ITP, antiplatelet autoantibodies that bind to the platelets are found in the blood. When the platelets are bound by the antibodies, the reticuloendothelial system (RES) or tissue macrophage system ingests the platelets, destroying them. The body attempts to compensate for this destruction by increasing platelet production within the marrow. There are two forms: acute (primarily in children) and chronic.

Clinical Manifestations

- Many patients have no symptoms.
- Petechiae and easy bruising (dry purpura).
- Heavy menses and mucosal bleeding (wet purpura; high risk of intracranial bleeding).
- Platelet count generally below 20,000/mm^3.
- Acute form self-limiting, possibly with spontaneous remissions.

Assessment and Diagnostic Findings

Usually the diagnosis is based on the decreased platelet count and survival time and increased bleeding time and ruling out other causes of thrombocytopenia. Key diagnostic procedures include platelet count, complete blood cell count, and bone marrow aspiration, which shows an increase in megakaryocytes (platelet precursors). Many patients are infected with *Helicobacter pylori*. To date, effectiveness of *H. pylori* treatment in relation to management of ITP is unknown.

Medical Management

Primary goal of treatment is a safe platelet count. Splenectomy is sometimes performed (thrombocytopenia may return months or years later).

Pharmacologic Therapy

Immunosuppressive medications, such as corticosteroids, are the treatment of choice. The bone mineral density of patients receiving chronic corticosteroid therapy needs to be monitored. These patients may benefit from calcium and vitamin D supplementation or bisphosphonate therapy to prevent significant bone disease.

- Intravenous gamma globulin (very expensive) and the chemotherapy agent vincristine are also effective.
- Another approach involves using anti-D (WinRho) for patients who are Rh(D) positive.
- Thrombopoiesis-stimulating protein AMG 531 has been successfully used to treat patients with chronic ITP.
- Epsilon aminocaproic acid (EACA; Amicar) may be useful for patients with significant mucosal bleeding who are refractory to other treatment modalities.
- Platelet infusions are avoided except to stop catastrophic bleeding.

Nursing Management

- Assess patient's lifestyle to determine the risk of bleeding from activity.
- Obtain history of medication use, including over-the-counter medications, herbs, and nutritional supplements; recent viral illness; or complaints of headache or visual disturbances (intracranial bleed). Be alert for sulfa-containing medications and medications that alter platelet function (eg, aspirin or other nonsteroidal anti-inflammatory drugs [NSAIDs]). Physical assessment should include a thorough search for signs of bleeding, neurologic assessment, and vital sign measurement.
- Teach patient to recognize exacerbations of disease (petechiae, ecchymoses); how to contact health care personnel; and the names of medications that induce ITP.

- Provide information about medications (tapering schedule, if relevant), frequency of platelet count monitoring, and medications to avoid.
- To minimize bleeding, instruct patient to avoid all agents that interfere with platelet function. Avoid administering medications by injection or rectal route; rectal temperature measurements should not be performed.
- Instruct patient to avoid constipation, the Valsalva maneuver, and tooth flossing.
- Encourage patient to use electric razor for shaving and soft-bristled toothbrushes instead of stiff-bristled brushes.
- Advise patient to refrain from vigorous sexual intercourse when platelet count is less than 10,000/mm^3.
- Monitor for complications, including osteoporosis, proximal muscle wasting, cataract formation, and dental caries.

For more information, see Chapter 33 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Impetigo

Impetigo is a superficial infection of the skin caused by staphylococci, streptococci, or multiple bacteria. Exposed areas of the body, face, hands, neck, and extremities are most frequently involved. Impetigo is contagious and may spread to other parts of the skin or to other members of the family who touch the patient or who use towels or combs that are soiled with the exudate of the lesion. Impetigo is seen in people of all ages. It is particularly common among children living in poor hygienic conditions. Chronic health problems, poor hygiene, and malnutrition may predispose adults to impetigo.

Clinical Manifestations

- Lesions begin as small, red macules that become discrete, thin-walled vesicles that rupture and become covered with a honey-yellow crust.
- These crusts, when removed, reveal smooth, red, moist surfaces on which new crusts develop.

- If the scalp is involved, the hair is matted, distinguishing the condition from ringworm.
- Bullous impetigo, a deep-seated infection of the skin caused by *Staphylococcus aureus*, is characterized by the formation of bullae from original vesicles. The bullae rupture, leaving a raw, red area.

Medical Management

Pharmacologic Therapy

Systemic antibiotic therapy is the usual treatment for impetigo. It reduces contagious spread, treats deep infection, and prevents acute glomerulonephritis (kidney infection).

- Agents for nonbullous impetigo: benzathine penicillin, oral penicillin, or erythromycin.
- Agents for bullous impetigo: penicillinase-resistant penicillin or erythromycin.
- Topical antibacterial therapy is the usual treatment for disease that is limited to a small area. The topical preparation is applied to lesions several times daily for 1 week. Lesions are soaked or washed with soap solution to remove central site of bacterial growth and to give the topical antibiotic an opportunity to reach the infected site.

Nursing Management

- Use antiseptic solutions (chlorhexidine [Hibiclens]) to cleanse the skin and reduce bacterial content and prevent spread.
- Wear gloves when giving care to patients with impetigo.
- Instruct patient and family to bathe at least once daily with bactericidal soap.
- Encourage cleanliness and good hygiene practices to prevent spread of lesion from one skin area to another and from one person to another.
- Instruct patient and family not to share bath towels and washcloths and to avoid physical contact between the infected person and other people until lesions heal.

For more information, see Chapter 56 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Increased Intracranial Pressure

Increased intracranial pressure (ICP) is the result of the amount of brain tissue, blood, and cerebrospinal fluid (CSF) within the skull at any one time. The volume and pressure of these three components are usually in a state of equilibrium. Because there is limited space for expansion within the skull, an increase in any of these components causes a change in the volume of the others by displacing or shifting CSF, increasing the absorption or diminishing the production of CSF, or decreasing cerebral blood volume. The normal ICP is 0 to 10 mm Hg with 15 mm Hg the upper limit of normal. Although elevated ICP is most commonly associated with head injury, an elevated pressure may be seen secondary to brain tumors, subarachnoid hemorrhage, and toxic and viral encephalopathies. Increased ICP from any cause decreases cerebral perfusion, stimulates further swelling, and may shift brain tissue, resulting in herniation, a dire and frequently fatal event.

Clinical Manifestations

When ICP increases to the point where the brain's ability to adjust has reached its limits, neural function is impaired. Increased ICP is manifested by changes in level of consciousness and abnormal respiratory and vasomotor responses.

- Lethargy is the earliest sign of increasing ICP. Slowing of speech and delay in response to verbal suggestions are early indicators.
- Sudden change in condition, such as restlessness (without apparent cause), confusion, or increasing drowsiness, has neurologic significance.
- As pressure increases, patient becomes stuporous and may react only to loud auditory or painful stimuli. This indicates serious impairment of brain circulation, and immediate surgical intervention may be required. With further deterioration, coma and abnormal motor responses in the form of decortication, decerebration, or flaccidity may occur.
- When coma is profound, pupils are dilated and fixed, respirations are impaired, and death is usually inevitable.

- Decreased cerebral perfusion pressure (CPP) can result in a Cushing's response and Cushing's triad (bradycardia, bradypnea, and hypertension); widening pulse pressure is an ominous sign.

Assessment and Diagnostic Methods

- Computed tomography (CT) and magnetic resonance imaging (MRI) most common diagnostic tests.
- ICP monitoring provides useful information (ventriculostomy, subarachnoid bolt/screw, epidural monitor, fiberoptic monitor).

Medical Management

Increased ICP is a true emergency and must be treated promptly. Immediate management involves invasive monitoring of ICP, decreasing cerebral edema, lowering the volume of CSF, or decreasing cerebral blood volume while maintaining cerebral perfusion.

Pharmacologic Therapy

- Osmotic diuretics and possibly corticosteroids are administered, fluid is restricted, CSF is drained, fever is controlled (using antipyretics, hypothermia blanket, with chlorpromazine [Thorazine] to control shivering), and cellular metabolic demands are reduced (with barbiturates, paralyzing agents).
- If patient does not respond to conventional treatment, cellular metabolic demands may be reduced by administering high doses of barbiturates or administering pharmacologic paralyzing agents, such as pancuronium (Pavulon).
- Patient requires care in a critical care unit.

NURSING PROCESS

The Patient with ICP

Assessment

- Obtain patient history with subjective data, including events leading to present illness.
- Complete a neurologic examination as patient's condition allows. Evaluate mental status, level of consciousness

(LOC), cranial nerve function, cerebellar function (balance and coordination), reflexes, and motor and sensitivity function.

- Ongoing assessment is more focused, including pupil checks, assessment of selected cranial nerves, frequent measurements of vital signs and ICP, and use of the Glasgow Coma Scale.

Diagnosis

Nursing Diagnoses

- Ineffective airway clearance related to diminished protective reflexes (cough, gag)
- Ineffective breathing patterns related to neurologic dysfunction (brain stem compression, structural displacement)
- Ineffective cerebral tissue perfusion related to the effects of increased ICP
- Deficient fluid volume related to fluid restriction
- Risk for infection related to ICP monitoring system (fiberoptic or intraventricular catheter)

Collaborative Problems/Potential Complications

- Brain stem herniation
- Diabetes insipidus
- Syndrome of inappropriate antidiuretic hormone (SIADH) secretion

Planning and Goals

The major goals of the patient may include maintenance of a patent airway, normalization of respiration, adequate cerebral tissue perfusion through reduction in ICP, restoration of fluid balance, absence of infection, and absence of complications.

Nursing Interventions

Maintaining a Patent Airway

- Maintain patency of the airway; oxygenate patient before and after suctioning.
- Discourage coughing and straining.
- Auscultate lung fields for adventitious sounds every 8 hours.

- Elevate the head of bed to help clear secretions and improve venous drainage of the brain.

Achieving an Adequate Breathing Pattern

- Monitor constantly for respiratory irregularities.
- Collaborate with respiratory therapist in monitoring arterial carbon dioxide pressure ($PaCO_2$), which is usually maintained below 30 mm Hg when hyperventilation therapy is used.
- Maintain continuous neurologic observation record with repeated assessments.

Optimizing Cerebral Tissue Perfusion

- Keep patient's head in a neutral (midline) position, maintained with the use of a cervical collar if necessary, to promote venous drainage. Elevation of the head is maintained at 30 to 45 degrees unless contraindicated.
- Avoid extreme rotation and flexion of the neck, because compression or distortion of the jugular veins increases ICP.
- Avoid extreme hip flexion: This position causes an increase in intra-abdominal and intrathoracic pressures, which produce a rise in ICP.
- Rotating beds, turning sheets, and holding the patient's head during turning may minimize the stimuli that increase ICP.
- Instruct patient to avoid the Valsalva maneuver; instruct patient to exhale while moving or turning in bed.
- Provide stool softeners and a high-fiber diet if patient can eat; note any abdominal distention; avoid enemas and cathartics.
- Avoid suctioning longer than 15 seconds; preoxygenated and hyperventilate on ventilator with 100% oxygen before suctioning.
- Pace interventions to prevent transient increases in ICP. During nursing care, ICP should not rise above 25 mm Hg and should return to baseline within 5 minutes.
- Maintain a calm atmosphere and reduce environmental stimuli; avoid emotional stress.

Maintaining Negative Fluid Balance

- Administer corticosteroids and dehydrating agents as ordered.
- Assess skin turgor, mucous membranes, urine output, and serum and urine osmolality for signs of dehydration.
- Administer intravenous fluids by pump at a slow to moderate rate; monitor patients receiving mannitol for congestive failure.
- Monitor vital signs to assess fluid volume status.
- Insert indwelling catheter to assess renal and fluid status.
- Monitor urine output every hour in the acute phase.
- Give oral hygiene for mouth dryness.

Preventing Infection

- Strictly adhere to the facility's written protocols for managing ICP monitoring systems.
- Use aseptic technique at all times when managing the ventricular drainage system and changing drainage bag.
- Check carefully for any loose connections that cause leaking and contamination of the ventricular system and contamination of CSF as well as inaccurate ICP readings.
- Check character of CSF drainage for signs of infection (cloudiness or blood). Report changes.
- Monitor for signs and symptoms of meningitis: fever, chills, nuchal (neck) rigidity, and increasing or persistent headache.

Monitoring and Managing Potential Complications

- Assess for and immediately report any of the following early signs or symptoms of increasing ICP: disorientation, restlessness, increased respiratory effort, purposeless movements, and mental confusion; pupillary changes and impaired extraocular movements; weakness in one extremity or on one side of the body; headache that is constant, increasing in intensity, and aggravated by movement or straining.
- Assess for and immediately report any of the following later signs and symptoms: LOC that continues to deteriorate until patient is comatose; decreased or erratic pulse rate and respiratory rate, increased blood pressure and

temperature, widened pulse pressure, rapidly fluctuating pulse; altered respiratory patterns (Cheyne–Stokes breathing and ataxic breathing; projectile vomiting; hemiplegia or decorticate or decerebrate posturing; loss of brain stem reflexes.

- ICP elevation: Monitor ICP closely for continuous elevation or significant increase over baseline; assess vital signs at time of ICP increase. Assess for and immediately report manifestations of increasing ICP.
- Impending brain herniation: Monitor for increase in blood pressure, decrease in pulse, and change in pupillary response.
- Diabetes insipidus requires fluid and electrolyte replacement and administration of vasopressin; monitor serum electrolytes for replacement.
- SIADH requires fluid restriction and serum electrolyte monitoring.

Evaluation

Expected Patient Outcomes

- Maintains patent airway
- Attains optimal breathing pattern
- Demonstrates optimal cerebral tissue perfusion
- Attains desired fluid balance
- Has no sign of infection
- Remains free of complications

For more information, see Chapter 61 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Influenza

Influenza is an acute viral disease that causes worldwide epidemics every 2 to 3 years with a highly variable degree of severity. The virus is easily spread from host to host through droplet exposure. Previous infection with influenza does not guarantee protection from future exposure. Mortality is probably attributable to accompanying pneumonia (viral or

superimposed bacterial pneumonia) and other chronic cardiopulmonary sequelae. Transmission is most likely to occur in the first 3 days of illness.

Management

Goals of medical and nursing management include relieving symptoms, treating complications, and preventing transmission. See "Nursing and Medical Management" under "Pharyngitis" and "Pneumonia" for additional information.

Prevention

Annual influenza vaccinations are recommended for those at high risk for complications of influenza. These include people older than 50 years, children 6 to 59 months of age, pregnant women, residents of extended care facilities, and those with chronic medical diseases or disabilities. In addition, health care providers and household members of those in high-risk groups should receive the vaccine to reduce the risk of transmission to people vulnerable to influenza sequelae.

For more information, see Chapters 23 and 70 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.



K

Kaposi's Sarcoma

Kaposi's sarcoma (KS) is the most common HIV-related malignancy and involves the endothelial layer of blood and lymphatic vessels. In people with AIDS, epidemic KS is most often seen among male homosexuals and bisexuals. AIDS-related KS exhibits a variable and aggressive course, ranging from localized cutaneous lesions to disseminated disease involving multiple organ systems.

Clinical Manifestations

- Cutaneous lesions can occur anywhere on the body and are usually brownish pink to deep purple. They characteristically present as lower-extremity skin lesions.
- Lesions may be flat or raised and surrounded by ecchymosis and edema; they develop rapidly and cause extensive disfigurement.
- The location and size of the lesions can lead to venous stasis, lymphedema, and pain. Common sites of visceral involvement include the lymph nodes, gastrointestinal tract, and lungs.
- Involvement of internal organs may eventually lead to organ failure, hemorrhage, infection, and death.

Assessment and Diagnostic Findings

- Diagnosis is confirmed by biopsy of suspected lesions.
- Prognosis depends on extent of tumor, presence of other symptoms of HIV infection, and the CD4+ count.
- Pathologic findings indicate that death occurs from tumor progression, but more often from other complications of HIV infection.

Medical Management

Treatment goals are to reduce symptoms by decreasing the size of the skin lesions, to reduce discomfort associated with edema and ulcerations, and to control symptoms associated with

mucosal or visceral involvement. No one treatment has been shown to improve survival rates. Radiation therapy is effective as a palliative measure to relieve localized pain due to tumor mass (especially in the legs) and for KS lesions that are in sites such as the oral mucosa, conjunctiva, face, and soles of the feet.

Pharmacologic Therapy

- Patients with cutaneous KS treated with alpha-interferon have experienced tumor regression and improved immune system function.
- Alpha-interferon is administered by the intravenous (IV), intramuscular, or subcutaneous route. Patients may self-administer interferon at home or receive interferon in an outpatient setting.
- Nonsteroidal anti-inflammatory drugs (NSAIDs) and opioids.

Nursing Management

- Provide thorough and meticulous skin care, involving regular turning, cleansing, and application of medicated ointments and dressings.
- Provide analgesic agents at regular intervals around the clock.
- Teach patient relaxation and guided imagery, which may be helpful in reducing pain and anxiety.
- Teach patient to self-administer alpha-interferon at home or arrange for patient to receive it in an outpatient setting.
- Support patient in coping with disfigurement of the condition; stress that lesions are temporary, when applicable (after immunotherapy is discontinued).
- Provide supportive care and treatment as ordered to minimize pain and edema, address complications, and promote healing.

For more information, see Chapter 52 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.



L

Leukemia

The common feature of the leukemias is an unregulated proliferation or accumulation of white blood cells (WBCs) in the bone marrow. There is also proliferation in the liver and spleen and invasion of other organs, such as the meninges, lymph nodes, gums, and skin. The leukemias are commonly classified according to the stem cell line involved, either lymphoid or myeloid. Leukemia is also classified as acute (abrupt onset) or chronic (evolves over months to years). Its cause is unknown. There is some evidence that genetic influence and viral pathogenesis may be involved. Bone marrow damage from radiation exposure or chemicals such as benzene and alkylating agents can also cause leukemia.

Clinical Manifestations

Cardinal signs and symptoms include weakness and fatigue, bleeding tendencies, petechiae and ecchymoses, pain, headache, vomiting, fever, and infection.

Assessment and Diagnostic Findings

Blood and bone marrow studies confirm proliferation of WBCs (leukocytes) in the bone marrow.

NURSING PROCESS

The Patient with Leukemia

Assessment

- Identify range of signs and symptoms reported by patient in nursing history and physical examination.
- Assess results of blood studies, and report alterations of WBCs, absolute neutrophil count (ANC), hematocrit, platelet, creatinine and electrolyte levels, hepatic function tests, and culture results.

Diagnosis

Nursing Diagnoses

- Risk for infection and bleeding
- Risk for impaired skin integrity related to toxic effects of chemotherapy, alteration in nutrition, and impaired mobility
- Impaired gas exchange
- Impaired mucous membranes from changes in epithelial lining of the gastrointestinal (GI) tract from chemotherapy or antimicrobial medications
- Imbalanced nutrition: less than body requirements related to hypermetabolic state, anorexia, mucositis, pain, and nausea
- Acute pain and discomfort related to mucositis, leukocytic infiltration of systemic tissues, fever, and infection
- Hyperthermia related to tumor lysis and infection
- Fatigue and activity intolerance related to anemia, infection, and deconditioning
- Impaired physical mobility due to anemia, malaise, discomfort, and protective isolation
- Risk for excess fluid volume related to renal dysfunction, hypoproteinemia, need for multiple intravenous (IV) medications and blood products
- Diarrhea due to altered GI flora, mucosal denudation, prolonged use of broad-spectrum antibiotics
- Risk for deficient fluid volume related to potential for diarrhea, bleeding, infection, and increased metabolic rate
- Self-care deficits related to fatigue, malaise, and protective isolation
- Anxiety due to knowledge deficit and uncertain future
- Disturbed body image related to change in appearance, function, and roles
- Grieving related to anticipatory loss and altered role functioning
- Risk for spiritual distress
- Deficient knowledge of disease process, treatment, complication management, and self-care measures

Collaborative Problems/Potential Complications

- Infection
- Bleeding/disseminated intravascular coagulation (DIC)

- Renal dysfunction
- Tumor lysis syndrome
- Nutritional depletion
- Mucositis
- Depression and anxiety

Planning and Goals

The major goals of the patient may include absence of complications and pain, attainment and maintenance of adequate nutrition, activity tolerance, ability to provide self-care and to cope with the diagnosis and prognosis, positive body image, and an understanding of the disease process and its treatment.

Nursing Interventions

Preventing or Managing Bleeding

- Assess for thrombocytopenia, granulocytopenia, and anemia.
- Report any increase in petechiae, melena, hematuria, or nosebleeds.
- Avoid trauma and injections; use small-gauge needles when analgesics are administered parenterally, and apply pressure after injections to avoid bleeding.
- Use acetaminophen instead of aspirin for analgesia.
- Give prescribed hormone therapy to prevent menses.
- Manage hemorrhage with bed rest and transfuse red blood cells and platelets as ordered.

Preventing Infection

- Infection is a major cause of death in leukemia patients.
- Assess temperature elevation, flushed appearance, chills, tachycardia, and appearance of white patches in the mouth.
- Observe for redness, swelling, heat, or pain in eyes, ears, throat, skin, joints, abdomen, and rectal and perineal areas.
- Assess for cough and changes in character or color of sputum.
- Give frequent oral hygiene.
- Wear sterile gloves to start infusions.

- Provide daily IV site care; observe for signs of infection.
- Ensure normal elimination; avoid rectal thermometers, enemas, and rectal trauma; avoid vaginal tampons.
- Avoid catheterization unless essential. Practice scrupulous asepsis if catheterization is necessary.

NURSING ALERT

The usual manifestations of infection are altered in patients with leukemia. Corticosteroid therapy may blunt the normal febrile and inflammatory responses to infection.

Managing Mucositis
- Assess the oral mucosa thoroughly; identify and describe lesions; note color and moisture (remove dentures first).
- Assist patient with oral hygiene with soft-bristled toothbrush.
- Avoid drying agents, such as lemon–glycerin swabs and commercial mouthwashes (use saline or saline and baking soda).
- Emphasize the importance of oral rinse medications to prevent yeast infections.
- Instruct patient to cleanse the perirectal area after each bowel movement; monitor frequency of stools, and stop stool softener with loose stool.

Improving Nutritional Intake
- Give frequent oral hygiene (before and after meals) to promote appetite; with oral anesthetics, caution patient to prevent self-injury and to chew carefully.
- Maintain nutrition with palatable, small, frequent feedings of soft nonirritating foods; provide nutritional supplements, as prescribed.
- Record daily boy weight, as well as intake and output, to monitor fluid status.
- Perform calorie counts and other more formal nutritional assessments.
- Provide parenteral nutrition, if required.

Easing Pain and Discomfort
- Administer acetaminophen rather than aspirin for analgesia.

- Sponge patient with cool water for fever; avoid cold water or ice packs; frequently change bedclothes; provide gentle back and shoulder massage.
- Provide oral hygiene (for stomatitis), and assist the patient with use of patient-controlled analgesia (PCA) for pain.
- Use creative strategies to permit uninterrupted sleep (a few hours). Assist the patient when awake to balance rest and activity to prevent deconditioning.
- Listen actively to patients enduring pain.

Decreasing Fatigue and Deconditioning

- Assist in choosing activity priorities; help patient balance activity and rest; suggest a stationary bicycle and sitting up in chair.
- Assist patient in using a high-efficiency particulate air (HEPA) filter mask to ambulate outside room.
- Arrange for physical therapy when indicated.

Maintaining Fluid and Electrolyte Balance

- Measure intake and output accurately; weigh the patient daily.
- Assess for signs of fluid overload or dehydration.
- Monitor laboratory tests (electrolytes, blood urea nitrogen [BUN], creatinine, and hematocrit), and replace blood, fluids, and electrolyte components as ordered and indicated.

Improving Self-Care

- Encourage the patient to do as much as possible.
- Listen empathetically to the patient.
- Assist patient to resume more self-care during recovery from treatment.

Managing Anxiety and Grief

- Provide emotional support, and discuss the impact of uncertain future.
- Assess how much information patient wants to have regarding the illness, its treatment, and potential complications; reassess at intervals.
- Assist patient to identify the source of grief, and encourage patient to allow time to adjust to the major life changes rendered by the illness.

- Arrange to have communication with nurses across care settings to reassure patient that he or she has not been abandoned.

Encouraging Spiritual Well-Being

- Assess the patient's spiritual and religious practices, and offer relevant services.
- Assist the patient to maintain realistic hope over the course of the illness (initially for a cure, in later stages for a quiet, dignified death).

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE

- Ensure that patients and their families have a clear understanding of disease and complications (risk for infection and bleeding).
- Teach family members about home care while patient is still in the hospital, particularly vascular access device management if applicable.

CONTINUING CARE

- Maintain communication between the patient and nurses across care settings.
- Provide specific instructions regarding when and how to seek care from the physician.

TERMINAL CARE

- Respect the patient's choices about treatment, including measures to prolong life and other end-of-life measures. Advance directives, including living wills, provide patients with some measure of control during terminal illness.
- Support families and coordinate home care services to alleviate anxiety about managing the patient's care in the home.
- Provide respite for the caregivers and patient with hospice volunteers.
- Give the patient and caregivers assistance to cope with changes in their roles and responsibilities (ie, anticipatory grieving).
- Provide information on hospital-based hospice programs for patients to receive palliative care in the hospital when care at home is no longer possible.

Evaluation

Expected Patient Outcomes

- Shows no evidence of infection
- Experiences no bleeding
- Exhibits intact oral mucous membranes
- Attains optimal level of nutrition
- Reports satisfaction with pain and discomfort levels
- Experiences less fatigue and increases activity
- Maintains fluid and electrolyte balance
- Participates in self-care
- Copes with anxiety and grief
- Experiences absence of complications

For more information, see Chapter 33 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Leukemia, Lymphocytic, Acute

Acute lymphocytic leukemia (ALL) results from an uncontrolled proliferation of immature cells (lymphoblasts) from the lymphoid stem cell. It is most common in young children; boys are affected more frequently than girls, with a peak incidence at 4 years of age. After age 15 years, ALL is uncommon. Therapy for this childhood leukemia has improved to the extent that about 80% of children survive at least 5 years.

Clinical Manifestations

- Immature lymphocytes proliferate in marrow and impede development of normal myeloid cells.
- Normal hematopoiesis is inhibited, resulting in reduced numbers of leukocytes, erythrocytes, and platelets.
- Leukocyte counts are low or high but always include immature cells.
- Manifestations of leukemic cell infiltration into other organs are more common with ALL than with other forms of leukemia and include pain from an enlarged liver or spleen and bone pain.

- The central nervous system is frequently a site for leukemic cells; thus, patients may exhibit headache and vomiting because of meningeal involvement. Other extranodal sites include the testes and breasts.

Medical Management

- Because ALL frequently invades the central nervous system, preventive cranial irradiation or intrathecal chemotherapy (eg, methotrexate) or both is also a key part of the treatment plan.
- Corticosteroids and vinca alkaloids are an integral part of the initial induction therapy. Typically, an anthracycline is included, sometimes with asparaginase (Elspar).
- Once a patient is in remission, intensification therapy (consolidation) ensues. In the adult with ALL, allogeneic transplant may be used for intensification therapy. For those for whom transplant is not an option (or is reserved for relapse), a prolonged maintenance phase ensues, when lower doses of medications are given for up to 3 years.

Nursing Management

See “Nursing Management” under “Leukemia” for additional information.

For more information, see Chapter 33 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Leukemia, Lymphocytic, Chronic

Chronic lymphocytic leukemia (CLL) is a common cancer of older adulthood; the average age at diagnosis is 72 years. It is derived from a malignant clone of B-lymphocytes. It was initially hypothesized that these cells can escape apoptosis (programmed cell death); however, this hypothesis is now being questioned. Most of the leukemia cells in CLL are fully mature, so it tends to be a mild disorder compared with the acute form. The disease is classified into three or four stages (two classification systems are in use). In the

early stage, an elevated lymphocyte count is seen; it can exceed 100,000/mm^3. The disease is usually diagnosed during physical examination or treatment for another disease.

Clinical Manifestations

- Many cases are asymptomatic.
- Lymphocytosis is always present.
- Erythrocyte and platelet counts may be normal or decreased.
- Lymphadenopathy (enlargement of lymph nodes), which is sometimes severe and painful, and splenomegaly may be noted.
- CLL patients can develop "B symptoms": fevers, sweats (especially night), and unintentional weight loss. Infections are common.
- Anergy (decreased or absent reaction to skin sensitivity tests) reveals the defect in cellular immunity.
- In the later stages, anemia and thrombocytopenia may develop.

Medical Management

- A major paradigm shift has occurred in CLL therapy. For years, there appeared to be no survival advantage in treating CLL in its early stages. However, with the advent of more sensitive means of assessing therapeutic response, it has been demonstrated that achieving a complete remission and eradicating even minimal residual disease results in improved survival.
- The chemotherapy agents fludarabine (Fludara) and cyclophosphamide (Cytoxan) are often given in combination with the monoclonal antibody rituximab (Rituxan).
- The monoclonal antibody alemtuzumab (Campath) is often used in combination with other chemotherapeutic agents when the disease is refractory to fludarabine, the patient has very poor prognostic markers, or it is necessary to eradicate residual disease after initial treatment.
- Prophylactic use of antiviral agents and antibiotics (eg, trimethoprim/sulfamethoxazole [Bactrim, Septra]) for patients receiving alemtuzumab (at significant risk for infection).

- IV immunoglobulin may prevent recurrent bacterial infections in selected patients.

Nursing Management

See "Nursing Management" under "Leukemia" for additional information.

For more information, see Chapter 33 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Leukemia, Myeloid, Acute

Acute myeloid leukemia (AML) results from a defect in the hematopoietic stem cell that differentiates into all myeloid cells: monocytes, granulocytes (eg, neutrophils, basophils, eosinophils), erythrocytes, and platelets. AML can be further classified into seven different subgroups based on cytogenetics, histology, and morphology (appearance) of the blasts. All age groups are affected; incidence rises with age and peaks at 67 years of age. It is the most common nonlymphocytic leukemia. Death usually occurs secondary to infection or hemorrhage.

Clinical Manifestations

- Most signs and symptoms evolve from insufficient production of normal blood cells: Fever and infection result from neutropenia, weakness and fatigue from anemia, and bleeding tendencies from thrombocytopenia. Major hemorrhage occurs with a platelet count of less than $10,000/mm^3$. The most common sites of bleeding are GI, pulmonary, and intracranial.
- Proliferation of leukemic cells within organs leads to a variety of additional symptoms: pain from an enlarged liver or spleen, hyperplasia of the gums, and bone pain from expansion of marrow.
- AML has its onset without warning; symptoms develop over weeks or over months.
- Peripheral blood shows decreased erythrocyte and platelet counts.

- The leukocyte count is low, normal, or high; the percentage of normal cells is usually vastly decreased.

Assessment and Diagnostic Methods

- Bone marrow specimen (excess of immature blast cells)
- Complete blood cell (CBC) count (decreased platelet count and erythrocyte count)

Medical Management

The objective is to achieve complete remission, typically with chemotherapy (induction therapy), which in some instances results in remissions lasting a year or longer.

Chemotherapy

- Cytarabine (Cytosar, Ara-C) and daunorubicin (Cerubidine)
- Mitoxantrone (Novantrone) or idarubicin (Idamycin)
- Sometimes etoposide (VP-16, VePesid) is added
- Consolidation therapy (postremission therapy with chemotherapy agents)

Supportive Care

- Administration of blood products
- Prompt treatment of infections
- Granulocyte colony-stimulating factor (G-CSF [filgrastim]) or granulocyte-macrophage colony-stimulating factor (GM-CSF [sargramostim]) to decrease neutropenia
- Antimicrobial therapy and transfusions as needed
- Occasionally, hydroxyurea (Hydrea) may be used briefly to control the increase of blast cells

Bone Marrow Transplantation

Bone marrow transplantation is used when a tissue match can be obtained. The transplantation procedure follows destruction of the leukemic marrow by chemotherapy.

Nursing Management

See "Nursing Management" under "Leukemia" for additional information.

For more information, see Chapter 33 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Leukemia, Myeloid, Chronic

Chronic myeloid leukemia (CML) arises from a mutation in the myeloid stem cells. A wide spectrum of cell types exists within the blood, from blast forms through mature neutrophils. A cytogenetic abnormality termed the Philadelphia chromosome is found in 90% to 95% of patients. CML is uncommon before 20 years of age, but the incidence increases with age (mean age is 67 years). CML has three stages: chronic, transformation, and accelerated or blast crisis. Marrow expands into cavities of the long bones, and cells are formed in the liver and spleen, with resultant painful enlargement problems. Infection and bleeding are rare until the disease transforms to the acute phase.

Clinical Manifestations

- Many patients are asymptomatic, and leukocytosis is detected by a CBC count performed for some other reason.
- Leukocyte count commonly exceeds 100,000/mm^3.
- Patients with extremely high leukocyte counts may be somewhat short of breath or slightly confused because of leukostasis.
- Splenomegaly with tenderness and hepatomegaly are common.
- Some patients have insidious symptoms, such as malaise, anorexia, and weight loss.
- In the transforming phase, bone pain, fever, weight loss, anemia, and thrombocytopenia are noted.

Medical Management

Pharmacologic Therapy

- Oral formulation of a tyrosine kinase inhibitor, imatinib mesylate (Gleevec).
- In those instances where imatinib (at conventional doses) does not elicit a molecular remission, or when that remission is not maintained, other treatment options may be considered: The dosage of imatinib can be increased (with increased toxicity), another inhibitor of *BCR-ABL* can be used (eg, dasatinib [Sprycel]), or allogeneic transplant can be used.

- Bone marrow transplant and peripheral blood stem cell transplantation are additional treatment strategies.
- In the acute form of CML (blast crisis), treatment may resemble induction therapy for acute leukemia, using the same medications as for AML or ALL.
- Oral chemotherapeutic agents, typically hydroxyurea or busulfan (Myleran); leukapheresis (leukocyte count greater than 300,000/mm^3); anthracycline chemotherapeutic agent (eg, daunomycin [Cerubidine]) for purely palliative approach (rare).

Nursing Management

Nursing management is similar to that for CLL. See "Nursing Management" under "Leukemia" for additional information.

For more information, see Chapter 33 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Lung Abscess

A lung abscess is necrosis of the pulmonary parenchyma caused by microbial infection; the lesion collapses and forms a cavity. It is generally caused by aspiration of anaerobic bacteria. Most lung abscesses are a complication of bacterial pneumonia or are caused by aspiration of oral anaerobes into the lung. Abscesses also may occur secondary to mechanical or functional obstruction of the bronchi. At-risk patients include those with impaired cough reflexes, loss of glottal closures, or swallowing difficulties, which may cause aspiration of foreign material. Other at-risk patients include those with central nervous system disorders (eg, seizure, stroke), drug addiction, alcoholism, esophageal disease, or compromised immune function; patients without teeth and those receiving nasogastric tube feedings; and patients with an altered state of consciousness due to anesthesia. The site of lung abscess is related to gravity and is determined by the patient's position. For patients in a recumbent position, the posterior segment of an upper lobe and the superior segment of the lower lobe are the most common areas. The organisms frequently

associated with lung abscesses are *Staphylococcus aureus*, *Klebsiella pneumoniae*, and other Gram-negative species.

Clinical Manifestations

- The clinical features vary from a mild productive cough to acute illness.
- Fever is accompanied by a productive cough of moderate to copious amounts of foul-smelling sputum, often bloody.
- Leukocytosis may be present.
- Pleurisy, or dull chest pain, dyspnea, weakness, anorexia, and weight loss are common.
- Chest dullness on percussion and decreased or absent breath sounds are found, with an intermittent pleural friction rub and possibly crackles on auscultation.

Assessment and Diagnostic Methods

Chest radiograph, sputum culture, and fiberoptic bronchoscopy are performed. A computed tomography (CT) scan of the chest may be required.

Medical Management

Prevention

To reduce the risk for lung abscess, give appropriate antibiotic therapy before dental procedures and maintain adequate dental and oral hygiene. Give appropriate antimicrobial therapy for pneumonia.

Treatment

Findings of the history, physical examination, chest x-ray, and sputum culture indicate type of organism and treatment.

- Coughing, postural drainage (chest physiotherapy), and possibly percutaneous catheter placement or, infrequently, bronchoscopy for abscess drainage are used.
- The patient is advised to eat a high-protein, high-calorie diet.
- Surgical intervention is rare. Pulmonary resection (lobectomy) is performed when there is massive hemoptysis or no response to medical management.

Pharmacologic Therapy

- IV antimicrobial therapy: Clindamycin (Cleocin) is the medication of choice. Large IV doses are required because

the antibiotic must penetrate necrotic tissue and abscess fluid.

- Antibiotics are administered orally instead of intravenously after signs of improvement (normal temperature, lowered WBC count, and improvement on chest x-ray [reduction in size of cavity]). Antibiotic therapy may last 4 to 8 weeks.

Nursing Management

- Administer antibiotic and IV therapy as prescribed, and monitor for any adverse effects.
- Initiate chest physiotherapy as prescribed to drain abscess.
- Teach patient deep-breathing and coughing exercises.
- Encourage diet high in protein and calories.
- Provide emotional support; abscess may take a long time to resolve.
- Teach patient or caregiver how to change the dressings to prevent skin excoriation and odor, how to monitor for signs and symptoms of infection, and how to care for and maintain the drain or tube.
- Remind patient to perform deep-breathing and coughing exercises every 2 hours during the day.
- Teach postural drainage and percussion techniques to caregiver.
- Provide counseling for attaining and maintaining an optimal state of nutrition.
- Emphasize importance of completing antibiotic regimen, rest, and appropriate activity levels to prevent relapse.
- Arrange home health nursing and visits by an IV therapy nurse to administer IV antibiotic therapy.

For more information, see Chapter 23 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Lymphedema and Elephantiasis

Lymphedema is classified as primary (congenital malformations) or secondary (acquired obstruction). Tissues in the extremities swell because of an increased quantity of lymph

that results from an obstruction of the lymphatic vessels. It is especially marked when the extremity is in a dependent position. The most common type is congenital lymphedema (lymphedema praecox), caused by hypoplasia of the lymphatic system of the lower extremity. It is usually seen in women and appears first between the ages of 15 and 25 years. The obstruction may be in both the lymph nodes and the lymphatic vessels. At times, it is seen in the arm after a radical mastectomy and in the leg in association with varicose veins or a chronic thrombophlebitis (from lymphangitis). Lymphatic obstruction caused by a parasite (filaria) is seen frequently in the tropics. When chronic swelling is present, there may be frequent bouts of infection (high fever and chills) and increased residual edema after inflammation resolves. These lead to chronic fibrosis, thickening of the subcutaneous tissues, and hypertrophy of the skin. The condition in which chronic swelling of the extremity recedes only slightly with elevation is referred to as elephantiasis.

Medical Management

- Active and passive exercise to assist in moving lymphatic fluid into the bloodstream; also manual lymphatic drainage (a massage technique)
- External compression devices; custom-fitted elastic stockings, when patient is ambulatory
- Strict bed rest with leg elevation to help mobilize fluids
- Manual lymphatic drainage in combination with compression bandages, exercises, skin care, pressure gradient sleeves, and pneumatic pumps (depending on the severity and stage of the lymphedema)

Pharmacologic Therapy

- Diuretic therapy, initially with furosemide (Lasix) to prevent fluid overload, and other diuretic therapy palliatively for lymphedema
- Antibiotic therapy if lymphangitis or cellulitis is present

Surgical Management

Excision of the affected subcutaneous tissue and fascia, with skin grafting to cover the defect, or surgical relocation of superficial lymphatic vessels into the deep lymphatic system

by means of a buried dermal flap to provide a conduit for lymphatic drainage.

Nursing Management

- If the patient undergoes surgery, provide standard postsurgical care of skin grafts and flaps, elevate the affected extremity, and observe for complications constantly (eg, flap necrosis, hematoma, or abscess under the flap, cellulitis).
- Instruct patient or caregiver to inspect the dressing daily; unusual drainage or any inflammation around the wound margin should be reported to the surgeon.
- Inform patient that there may be a loss of sensation in the skin graft area.
- Instruct patient to avoid the application of heating pads or exposure to sun to prevent burns or trauma to the area.

For more information, see Chapter 31 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.



M

Mastoiditis and Mastoid Surgery

Mastoiditis is an inflammation of the mastoid resulting from an infection of the middle ear (otitis media). Since the discovery of antibiotics, acute mastoiditis has been rare. Chronic otitis media may cause chronic mastoiditis. Chronic mastoiditis can lead to the formation of cholesteatoma (ingrowth of the skin of the external layer of the eardrum into the middle ear). If mastoiditis is untreated, osteomyelitis may occur.

Clinical Manifestations

- Pain and tenderness behind the ear (postauricular)
- Discharge from the middle ear (otorrhea)
- Mastoid area that becomes erythematous and edematous

Medical Management

General symptoms are usually successfully treated with antibiotics; occasionally, myringotomy is required.

Surgical Management

If recurrent or persistent tenderness, fever, headache, and discharge from the ear are evident, mastoidectomy may be necessary to remove the cholesteatoma and gain access to diseased structures.

NURSING PROCESS

THE PATIENT UNDERGOING MASTOID SURGERY

Assessment

- During the health history, collect data about the ear problem, including infection, otalgia, otorrhea, hearing loss and vertigo, duration and intensity, causation, prior treatments, health problems, current medications, family history, and drug allergies.

- During the physical assessment, observe for erythema, edema, otorrhea, lesions, and odor and color of discharge.
- Review results of audiogram.

Diagnosis

Nursing Diagnoses

- Anxiety related to surgical procedure, potential loss of hearing, potential taste disturbance, and potential loss of facial movement
- Acute pain related to mastoid surgery
- Risk for infection related to mastoidectomy, placement of grafts, prostheses, or electrodes; surgical trauma to surrounding tissues and structures
- Disturbed auditory sensory perception related to ear disorder, surgery, or packing
- Risk for trauma related to impaired balance or vertigo during the immediate postoperative period or from dislodgment of the graft or prosthesis
- Disturbed sensory perception related to potential damage to facial nerve (cranial nerve VII) and chorda tympani nerve
- Deficient knowledge about mastoid disease, surgical procedure, and postoperative care and expectations

Planning and Goals

Major goals for mastoidectomy include reduction of anxiety; freedom from pain and discomfort; prevention of infection; stable or improved hearing and communication; absence of vertigo and related injury; absence of or adjustment to sensory or perceptual alterations; and increased knowledge regarding the disease, surgical procedure, and postoperative care.

Nursing Interventions

Reducing Anxiety

- Reinforce information the otologic surgeon has discussed: anesthesia, the location of the incision (postauricular), and expected surgical results (hearing, balance, taste, and facial movement).
- Encourage patient to discuss any anxiety or concerns.

Relieving Pain

- Administer prescribed analgesic agent for the first 24 hours postoperatively and then only as needed.
- If a tympanoplasty is also performed, inform patient that he or she may have packing or a wick in the external auditory canal and may experience sharp shooting pains in the ear for 2 to 3 weeks postoperatively.
- Inform patient that throbbing pain accompanied by fever may indicate infection and should be reported to the physician.

Preventing Infection

- Explain prescribed prophylactic antibiotic regimen.
- Instruct patient to keep water from entering the ear for 6 weeks and to keep postauricular incision dry for 2 days; a cotton ball or lamb's wool covered with a water-insoluble substance (eg, petroleum jelly) and placed loosely in the ear canal usually prevents water contamination.
- Observe for and report signs of infection (fever, purulent drainage).
- Inform patient that some serous drainage is normal postoperatively.

Improving Hearing and Communication

- Initiate measures to improve hearing and communication: Reduce environmental noise, face patient when speaking, speak clearly and distinctly without shouting. Provide good lighting if patient must speech-read and use nonverbal clues.
- Instruct family that patient will have temporarily reduced hearing from surgery as a result of edema, packing, and fluid in middle ear; instruct family in ways to improve communication with patient.

Preventing Injury

- Administer antiemetics or antivertiginous medications (eg, antihistamines) as prescribed if a balance disturbance or vertigo occurs.
- Assist patient with ambulation to prevent falls and injury.
- Instruct patient to avoid heavy lifting, straining, exertion, and nose blowing for 2 to 3 weeks after surgery to prevent

dislodging the tympanic membrane graft or ossicular prosthesis.

Preventing Altered Sensory Perception

- Reinforce to patient that a taste disturbance and dry mouth may be experienced on the operated side for several months until the nerve regenerates.
- Instruct patient to report immediately any evidence of facial nerve (cranial nerve VII) weakness, such as drooping of the mouth on the operated side.

Promoting Home- and Community-Based Care

- Provide instructions about prescribed medications: analgesics, antivertiginous agents, and antihistamines for balance disturbance.
- Inform patient about the expected effects and potential side effects of the medications.
- Instruct patient about any activity restrictions.
- Teach patient to monitor for possible complications, such as infection, facial nerve weakness, or taste disturbances, including signs and symptoms to report immediately.
- Refer patients, particularly elderly patients, for home care nursing.
- Caution caregiver and patient that patient may experience some vertigo and will therefore require help with ambulation to avoid falling.
- Instruct patient to report promptly any symptoms of complications to the surgeon.
- Stress the importance of scheduling and keeping follow-up appointments.

Evaluation

Expected Patient Outcomes

- Demonstrates reduced anxiety about surgical procedure
- Remains free of discomfort or pain
- Demonstrates no signs or symptoms of infection
- Exhibits signs that hearing has stabilized or improved
- Remains free of injury and trauma
- Adjusts to or remains free of altered sensory perception

- Verbalizes the reasons for and methods of care and treatment

For more information, see Chapter 59 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Ménière's Disease

Ménière's disease is an abnormal inner ear fluid balance (too much circulatory fluid) caused by malabsorption in the endolymphatic sac or blockage in the duct. Endolymphatic hydrops, a dilation in the endolymphatic space, develops. Either increased pressure in the system or rupture of the inner ear membranes occurs, producing symptoms. Although it has been reported in children, Ménière's disease is more common in adults, with the average age of onset in the 40s. There is no cure. There are two possible subsets of the disease: cochlear and vestibular.

Cochlear Disease

Cochlear disease is recognized as a fluctuating, progressive sensorineural hearing loss associated with tinnitus and aural pressure in the absence of vestibular symptoms or findings.

Vestibular Disease

Vestibular disease is characterized as the occurrence of episodic vertigo associated with aural pressure but no cochlear symptoms.

Clinical Manifestations

Symptoms of Ménière's disease include fluctuating, progressive sensorineural hearing loss; tinnitus or a roaring sound; a feeling of pressure or fullness in the ear; and episodic, incapacitating vertigo, often accompanied by nausea and vomiting. At the onset, only one or two symptoms may be manifested. Attacks occur with increasing frequency until eventually all of the symptoms develop.

Assessment and Diagnostic Methods

- Disease is not diagnosed until the four major symptoms are present; careful history of vertigo and nausea and vomiting contributes to diagnosis.
- There is no absolute diagnostic test for this disease.
- Audiovestibular diagnostic procedures, including Weber's test, are used with finding of sensorineural hearing loss in the affected ear.
- Electronystagmogram may be normal or may show reduced vestibular response.

Medical Management

Goals of treatment may include recommendations for changes in lifestyle and habits or surgical treatment. The treatment is designed to eliminate vertigo or to stop the progression of or stabilize the disease. Psychological evaluation may be indicated if patient is anxious, uncertain, fearful, or depressed.

Dietary Management

- Low sodium (1,000 to 1,500 mg/day or less)
- Avoidance of alcohol, monosodium glutamate (MSG), aspirin and aspirin-containing medications

Pharmacologic Therapy

- Antihistamines, such as meclizine (Antivert), to suppress the vestibular system; tranquilizers such as diazepam (Valium) to help control vertigo; antiemetics such as promethazine (Phenergan) suppositories to control the nausea, vomiting, and vertigo.
- Diuretics to lower pressure in the endolymphatic system.
- Vasodilators are often used in conjunction with other therapies.

Surgical Management

Surgical procedures include endolymphatic sac procedures and vestibular nerve section. However, hearing loss, tinnitus, and aural fullness may continue, because the surgical treatment of Ménière's disease is aimed at eliminating the attacks of vertigo.

Nursing Management: The Patient with Vertigo

Preventing Injury

- Assess for vertigo.
- Reinforce vestibular and balance therapy as prescribed.

- Administer and teach about antivertiginous medication and vestibular sedation; instruct in side effects.
- Encourage patient to sit down when dizzy.
- Recommend that patient keep eyes open and stare straight ahead when lying down and experiencing vertigo; place pillows on side of head to restrict movement.
- Assist patient in identifying aura that suggests an impending attack.

Adjusting to Disability

- Encourage patient to identify personal strengths and roles that can be fulfilled.
- Provide information about vertigo and what to expect.
- Include family and significant others in rehabilitative process.
- Encourage patient in making decisions and assuming more responsibility for care.

Maintaining Fluid Volume

- Assess intake and output; monitor laboratory values.
- Assess indicators of dehydration.
- Encourage oral fluids as tolerated; avoid caffeine (a vestibular stimulant).
- Teach about antiemetics and antidiarrheal medications.

Relieving Anxiety

- Assess level of anxiety; help identify successful coping skills.
- Provide information about vertigo and its treatment.
- Encourage patient to discuss anxieties and explore concerns about vertigo attacks.
- Teach stress management; provide comfort measures.

Teaching Patients Self-Care

- Teach patient to administer antiemetic and other prescribed medications to relieve nausea and vomiting.
- Encourage patient to care for bodily needs when free of vertigo.
- Review diet with patient and caregivers; offer fluids as necessary.

For more information, see Chapter 59 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Meningitis

Meningitis is an inflammation of the lining around the brain and spinal cord caused by bacteria or viruses. Meningitis is classified as septic or aseptic. The aseptic form may be viral or secondary to lymphoma, leukemia, or human immunodeficiency virus (HIV). The septic form is caused by bacteria such as *Streptococcus pneumoniae* and *Neisseria meningitidis*.

Pathophysiology

The causative organism enters the bloodstream, crosses the blood–brain barrier, and triggers an inflammatory reaction in the meninges. Independent of the causative agent, inflammation of the subarachnoid and pia mater occurs. Increased intracranial pressure (ICP) results. Meningeal infections generally originate in one of two ways: either through the bloodstream from other infections (cellulitis) or by direct extension (after a traumatic injury to the facial bones). Bacterial or meningococcal meningitis also occurs as an opportunistic infection in patients with acquired immunodeficiency syndrome (AIDS) and as a complication of Lyme disease.

Bacterial meningitis is the most significant form. The common bacterial pathogens are *N. meningitidis* (meningococcal meningitis) and *S. pneumoniae*, accounting for 80% of cases of meningitis in adults. *Haemophilus influenzae* was once a common cause of meningitis in children, but, because of vaccination, infection with this organism is now rare in developed countries.

Clinical Manifestations

- Headache and fever are frequently the initial symptoms; fever tends to remain high throughout the course of the illness; the headache is usually either steady or throbbing and very severe as a result of meningeal irritation.
- Meningeal irritation results in a number of other well-recognized signs common to all types of meningitis:
  - Nuchal rigidity (stiff neck) is an early sign.
  - Positive Kernig's sign: When lying with thigh flexed on abdomen, patient cannot completely extend leg.
  - Positive Brudzinski's sign: Flexing patient's neck produces flexion of the knees and hips; passive flexion of

  - lower extremity of one side produces similar movement for opposite extremity.
  - Photophobia (extreme sensitivity to light) is common.
- Rash (*N. meningitidis*): ranges from petechial rash with purpuric lesions to large areas of ecchymosis.
- Disorientation and memory impairment; behavioral manifestations are also common. As the illness progresses, lethargy, unresponsiveness, and coma may develop.
- Seizures can occur and are the result of areas of irritability in the brain; ICP increases secondary to diffuse brain swelling or hydrocephalus; initial signs of increased ICP include decreased level of consciousness and focal motor deficits.
- An acute fulminant infection occurs in about 10% of patients with meningococcal meningitis, producing signs of overwhelming septicemia: an abrupt onset of high fever, extensive purpuric lesions (over the face and extremities), shock, and signs of disseminated intravascular coagulation (DIC); death may occur within a few hours after onset of the infection.

Assessment and Diagnostic Findings

- Computed tomography (CT) scan or magnetic resonance imaging (MRI) scan to detect a shift in brain contents (which may lead to herniation) prior to a lumbar puncture.
- Key diagnostic tests: bacterial culture and Gram staining of CSF and blood.

Prevention

The Advisory Committee on Immunization Practices of the Centers for Disease Control and Prevention (CDC) (2008) recommends that the meningococcal conjugated vaccine be given to adolescents entering high school and to college freshmen living in dormitories. Vaccination should also be considered as an adjunct to antibiotic chemoprophylaxis for anyone living with a person who develops meningococcal infection. Vaccination against *H. influenzae* and *S. pneumoniae* should be encouraged for children and at-risk adults.

People in close contact with patients with meningococcal meningitis should be treated with antimicrobial chemoprophylaxis

using rifampin (Rifadin), ciprofloxacin hydrochloride (Cipro), or ceftriaxone sodium (Rocephin). Therapy should be started within 24 hours after exposure because a delay in the initiation of therapy limits the effectiveness of the prophylaxis.

Medical Management

- Vancomycin hydrochloride in combination with one of the cephalosporins (eg, ceftriaxone sodium, cefotaxime sodium) is administered by intravenous (IV) injection.
- Dexamethasone (Decadron) has been shown to be beneficial as adjunct therapy in the treatment of acute bacterial meningitis and in pneumococcal meningitis.
- Dehydration and shock are treated with fluid volume expanders.
- Seizures, which may occur early in the course of the disease, are controlled with phenytoin (Dilantin).
- Increased ICP is treated as necessary.

Nursing Management

Prognosis depends largely on the supportive care provided. Related nursing interventions include the following:

- Assess neurologic status and vital signs constantly. Determine oxygenation from arterial blood gas values and pulse oximetry.
- Insert cuffed endotracheal tube (or tracheostomy), and position patient on mechanical ventilation as prescribed.
- Assess blood pressure (usually monitored using an arterial line) for incipient shock, which precedes cardiac or respiratory failure.
- Rapid IV fluid replacement may be prescribed, but take care not to overhydrate patient because of risk of cerebral edema.
- Reduce high fever to decrease load on heart and brain from oxygen demands.
- Protect the patient from injury secondary to seizure activity or altered level of consciousness (LOC).
- Monitor daily body weight; serum electrolytes; and urine volume, specific gravity, and osmolality, especially if syndrome of inappropriate antidiuretic hormone (SIADH) is suspected.

- Prevent complications associated with immobility, such as pressure ulcers and pneumonia.
- Institute infection control precautions until 24 hours after initiation of antibiotic therapy (oral and nasal discharge is considered infectious).
- Inform family about patient's condition and permit family to see patient at appropriate intervals.

For more information, see Chapter 64 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Mitral Regurgitation (Insufficiency)

Mitral regurgitation involves blood flowing back from the left ventricle into the left atrium during systole. Often, the edges of the mitral valve leaflets do not close during systole. There is a problem with one or more of the leaflets, the chordae tendineae, the annulus, or the papillary muscles. With each beat, the left ventricle forces some blood back into the left atrium, causing the atrium to dilate and hypertrophy. This backward flow of blood from the ventricle eventually causes the lungs to become congested, which adds strain to the right ventricle, resulting in cardiac failure.

Clinical Manifestations

Chronic mitral regurgitation is often asymptomatic; but acute regurgitation (after myocardial infarction [MI]) usually presents as severe heart failure.

- Dyspnea, fatigue, and weakness are the most common symptoms.
- Palpitations, shortness of breath on exertion, and cough from pulmonary congestion also occur.

Assessment and Diagnostic Methods

A systolic murmur is heard as a high-pitched, blowing sound at the apex. The pulse may be regular and of good volume, or it may be irregular as a result of extrasystolic beats or atrial fibrillation. Doppler echocardiography is used to diagnose and

monitor the progression of mitral regurgitation. Transesophageal echocardiography (TEE) provides the best images of the mitral valve.

Medical Management

Management is the same as for heart failure. Surgical intervention consists of mitral valve replacement or valvuloplasty.

For more information, see Chapter 29 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Mitral Stenosis

Mitral stenosis is the progressive thickening and contracture of the mitral valve leaflets and chordae tendineae that causes narrowing of the orifice and progressive obstruction to blood flow from the left atrium into the left ventricle. Normally, the mitral valve opening is as wide as three fingers. In cases of marked stenosis, the opening narrows to the width of a pencil. The left atrium dilates and hypertrophies because it has great difficulty moving blood into the ventricle and because of the increased blood volume the atria must now hold. Because there is no valve to protect the pulmonary veins from the backward flow of blood from the atrium, the pulmonary circulation becomes congested. The resulting high pulmonary pressure can eventually lead to right ventricular failure.

Clinical Manifestations

- The first symptom is often dyspnea on exertion (due to pulmonary venous hypertension).
- Progressive fatigue (result of low cardiac output), dry cough or wheezing, hemoptysis, palpitations, orthopnea, paroxysmal nocturnal dyspnea (PND), and repeated respiratory infections may be noted.
- Weak and often irregular pulse (because of atrial fibrillation) may also be noted.

Assessment and Diagnostic Methods

- Doppler echocardiography is used to diagnose mitral stenosis.
- Electrocardiography (ECG) and cardiac catheterization with angiography may be used to help determine the severity of the mitral stenosis.

Medical Management

See "Medical Management" and "Nursing Management" under "Heart Failure" for additional information. Additional management measures include the following:

- Congestive heart failure is treated.
- Anticoagulants to decrease the risk for developing atrial thrombus.
- Treatment of anemia if required.
- Strenuous exercise restrictions.
- Surgical intervention consists of valvuloplasty, usually a commissurotomy to open or rupture the fused commissures of the mitral valve.
- Percutaneous transluminal valvuloplasty or mitral valve replacement may be performed.

For more information, see Chapter 29 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Mitral Valve Prolapse

Mitral valve prolapse is a dysfunction of the mitral valve leaflets that prevents the mitral valve from closing completely during systole. Blood then regurgitates from the left ventricle back into the left atrium. It occurs more frequently in women.

Clinical Manifestations

The syndrome may produce no symptoms or may progress rapidly and result in sudden death.

- Patients may experience symptoms of fatigue, shortness of breath (not correlated with activity), lightheadedness, dizziness, syncope, palpitations, chest pain, and anxiety.
- Fatigue may be present regardless of the person's activity level and amount of rest or sleep.

- During the physical examination, a mitral (systolic) click is identified. Presence of a click is an early sign that a valve leaflet is ballooning into the left atrium.
- A murmur of mitral regurgitation may be heard if progressive valve leaflet stretching and regurgitation have occurred.
- A few patients experience signs and symptoms of heart failure if mitral regurgitation exists.

Medical Management

Medical management is directed at controlling symptoms.

- Dietary restrictions; avoidance of alcohol and caffeine; smoking cessation.
- Antiarrhythmic medications may be prescribed.
- In advanced stages, mitral valve repair or replacement may be necessary.

Nursing Management

- Teach patient about the diagnosis and the possibility that the disorder is hereditary.
- Teach the patient how to minimize risk for infectious endocarditis: practicing good oral hygiene, obtaining routine dental care, avoiding body piercing and body branding, and not using toothpicks or other sharp objects in the oral cavity.
- Explain the need to inform the health care provider about any symptoms that may develop.
- Explain that alcohol, caffeine, ephedrine, and epinephrine, which may be in over-the-counter preparations, may stimulate dysrhythmias. Teach patient to read product labels to avoid these agents.
- Explore possible diet, activity, sleep, and other lifestyle factors that may correlate with symptoms.

For more information, see Chapter 29 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Multiple Myeloma

Multiple myeloma is a malignant disease of the most mature form of B lymphocyte, the plasma cell. Plasma cells secrete

immunoglobulins, proteins necessary for antibody production to fight infection. The malignant plasma cells produce an increased amount of a specific immunoglobulin that is nonfunctional. Functional types of immunoglobulin are still produced by nonmalignant plasma cells, but in lower-than-normal quantity. The median 5-year survival rate for newly diagnosed patients is 33%.

Clinical Manifestations

- The classic presenting symptom of multiple myeloma is bone pain, usually in the back or ribs; pain increases with movement and decreases with rest; patients may report that they have less pain on awakening but more during the day.
- Severe bone destruction causing vertebral collapse and fractures, including spinal fractures, which can impinge on the spinal cord and result in spinal cord compression.
- Hypercalcemia may develop; renal failure may also occur.
- Anemia; a reduced number of leukocytes and platelets (late stage).
- Neurologic manifestations (eg, spinal cord compression).
- Hyperviscosity, manifested by bleeding from the nose or mouth, headache, blurred vision, paresthesias, or heart failure.

Assessment and Diagnostic Methods

- An elevated monoclonal protein spike in the serum (via serum protein electrophoresis), urine (via urine protein electrophoresis), or light chain (via serum-free light chain analysis) is considered to be a major criterion in the diagnosis of multiple myeloma.
- The diagnosis of myeloma is confirmed by bone marrow biopsy.

Gerontologic Considerations

The incidence of multiple myeloma increases with age. The disease rarely occurs before age 40 years. Closely investigate any back pain, which is a common presenting complaint.

Medical Management

- For those who are not candidates for transplant, chemotherapy is the primary treatment.

- Corticosteroids, particularly dexamethasone (Decadron), are often combined with other agents (eg, melphalan [Alkeran], thalidomide [Thalomid], lenalidomide [Revlimid], and bortezomib [Velcade]).
- Radiation therapy in combination with systemic treatment such as chemotherapy.
- Vertebroplasty often performed when lytic lesions result in vertebral compression fractures.
- Some bisphosphonates, such as pamidronate (Aredia) and zoledronic acid (Zometa), have been shown to strengthen bone in multiple myeloma by diminishing survival of osteoclasts.
- Plasmapheresis when patients have signs and symptoms of hyperviscosity.
- Narcotic analgesics, thalidomide, and bortezomib for refractory disease and severe pain.

Nursing Management

- Administer medications as recommended for pain relief.
- Carefully monitor for renal function and assess for gastritis.
- Educated about activity restrictions (eg, lifting no more than 10 lb, use of proper body mechanics); braces are occasionally needed to support the spinal column.
- Teach patient to recognize and report signs and symptoms of hypercalcemia.
- Observe for bacterial infections (pneumonia); instruct patient in appropriate infection prevention measures.
- Maintain mobility and use strategies that enhance venous return (eg, antiembolism stockings, avoid crossing the legs).

For more information, see Chapter 33 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Multiple Sclerosis

Multiple sclerosis (MS) is a chronic, degenerative, progressive disease of the central nervous system (CNS) characterized by small patches of demyelination in the brain and spinal cord.

Demyelination (destruction of myelin) results in impaired transmission of nerve impulses.

Pathophysiology

The cause of MS is not known, but a defective immune response probably plays a major role. In MS, sensitized T cells inhabit the CNS and facilitate the infiltration of other agents that damage the immune system. The immune system attack leads to inflammation that destroys myelin and oligodendroglial cells that produce myelin in the CNS. Plaques of sclerotic tissue appear on demyelinated axons, further interrupting the transmission of impulses.

MS may occur at any age but typically manifests in young adults between the ages of 20 and 40 years; it affects women more frequently than men. Geographic prevalence is highest in Europe, New Zealand, southern Australia, the northern United States, and southern Canada.

Disease Course

MS has various courses:

- Benign course in which symptoms are so mild that patients do not seek health care or treatment.
- Relapsing remitting course (80% to 85%), with complete recovery between relapses; 50% of these patients progress to a secondary progressive course, in which disease progression occurs with or without relapses.
- Primary progressive course (10%), in which disabling symptoms steadily increase, with rare plateaus and temporary improvement; may result in quadriparesis, cognitive dysfunction, visual loss, and brain stem syndromes.
- Progressive relapsing course (least common, about 5%), which is characterized by relapses with continuous disabling progression between exacerbations.

Clinical Manifestations

- Signs and symptoms are varied and multiple and reflect the location of the lesion (plaque) or combination of lesions.
- Primary symptoms: fatigue, depression, weakness, numbness, difficulty in coordination, loss of balance, and pain.

- Visual disturbances: blurring of vision, diplopia (double vision), patchy blindness (scotoma), and total blindness.
- Spastic weakness of the extremities and loss of abdominal reflexes; ataxia and tremor.
- Cognitive and psychosocial problems; depression, emotional lability, and euphoria.
- Bladder, bowel, and sexual problems possible.

Secondary Manifestations Related to Complications

- Urinary tract infections, constipation
- Pressure ulcers, contracture deformities, dependent pedal edema
- Pneumonia
- Reactive depressions and osteoporosis
- Emotional, social, marital, economic, and vocational problems

Exacerbations and Remissions

Relapses may be associated with periods of emotional and physical stress.

Assessment and Diagnostic Findings

- MRI (primary diagnostic tool) to visualize small plaques
- Electrophoresis study of the cerebrospinal fluid (CSF); abnormal immunoglobulin G antibody (oligoclonal bonding)
- Evoked potential studies and urodynamic studies
- Neuropsychological testing as indicated to assess cognitive impairment
- Sexual history to identify changes in sexual function

Medical Management

Because no cure exists for MS, the goals of treatment are to delay the progression of the disease, manage chronic symptoms, and treat acute exacerbations. An individualized treatment program is indicated to relieve symptoms and provide support. Management strategies target the various motor and sensory symptoms and effects of immobility that can occur. Radiation therapy may be used to induce immunosuppression.

Pharmacologic Therapy

Disease Modification

- Interferon beta-1a (Rebif) and interferon beta-1b (Betaseron) are administered subcutaneously. Another preparation of

interferon beta-1a, Avonex, is administered intramuscularly once a week.
- Glatiramer acetate (Copaxone) to reduce the rate of relapse in the RR course of MS; administered subcutaneously daily.
- IV methylprednisolone to treat acute relapse in the relapsing remitting course.
- Mitoxantrone (Novantrone) is administered via IV infusion every 3 months for patients with secondary-progressive or worsening relapsing-remitting MS.

Symptom Management

- Baclofen (Lioresal) is the medication of choice for treating spasticity; benzodiazepines (Valium), tizanidine (Zanaflex), and dantrolene (Dantrium) may also be used to treat spasticity.
- Amantadine (Symmetrel), pemoline (Cylert), or fluoxetine (Prozac) to treat fatigue.
- Beta-adrenergic blockers (Inderal), antiseizure agents (Neurontin), and benzodiazepines (Klonopin) to treat ataxia.

Management of Related Bowel and Bladder Problems

Anticholinergics, alpha-adrenergic blockers, or antispasmodic agents may be used to treat problems related to elimination, and patients may be taught to perform intermittent self-catheterization as well. Additional measures include assessment of urinary tract infections; ascorbic acid to acidify urine; antibiotics when appropriate.

NURSING PROCESS

The Patient with MS

Assessment

- Assess actual and potential problems associated with the disease: neurologic problems, secondary complications, and impact of disease on patient and family.
- Assess patient's function, particularly ambulation, when patient is well rested and when fatigued; look for weakness, spasticity, visual impairment, incontinence, and disorders of swallowing and speech.

- Assess how MS has affected the patient's lifestyle, how the patient is coping, and what the patient would like to improve.

Diagnosis

Nursing Diagnoses

- Impaired bed and physical mobility related to weakness, muscle paresis, spasticity
- Risk for injury related to sensory and visual impairment
- Impaired urinary and bowel elimination related to nervous system dysfunction
- Impaired verbal communication and risk for aspiration related to cranial nerve involvement
- Disturbed thought processes (loss of memory, dementia, euphoria) related to cerebral dysfunction
- Ineffective individual coping related to uncertainty of diagnosis
- Impaired home maintenance management related to physical, psychological, and social limits imposed by MS
- Potential for sexual dysfunction related to lesions or psychological reaction

Planning and Goals

The major goals of the patient may include promotion of physical mobility, avoidance of injury, achievement of bladder and bowel continence, promotion of speech and swallowing mechanisms, improvement of cognitive function, development of coping strengths, improved home maintenance management, and adaptation to sexual dysfunction.

Nursing Interventions

Promoting Physical Mobility

- Encourage relaxation and coordination exercises to promote muscle efficiency.
- Encourage progressive resistance exercises to strengthen weak muscles.
- Encourage walking exercises to improve gait.
- Apply warm packs to spastic muscles; avoid hot baths due to sensory loss.

- Encourage daily exercises for muscle stretching to minimize joint contractures.
- Encourage swimming, stationary bicycling, and progressive weight bearing to relieve spasticity in legs.
- Avoid hurrying patient in any activity, because hurrying increases spasticity.
- Encourage patient to work up to a point just short of fatigue.
- Advise patient to take frequent short rest periods, preferably lying down, to prevent extreme fatigue.
- Prevent complications of immobility by assessment and maintenance of skin integrity and through coughing and deep-breathing exercises.

Preventing Injury

- Teach patient to walk with feet wide apart to increase walking stability if motor dysfunction causes incoordination.
- Teach patient to watch the feet while walking if there is a loss of position sense.
- Provide a wheelchair or motorized scooter if gait remains insufficient after gait training (walker, cane, braces, crutches, parallel bars, and physical therapy).
- Assess skin for pressure ulcers if patient is confined to wheelchair.

Enhancing Bladder and Bowel Control

- Keep bedpan or urinal readily available because the need to void must be heeded immediately.
- Set up a voiding schedule, with gradual lengthening of time intervals.
- Instruct patient to drink a measured amount of fluid every 2 hours and to attempt to void 30 minutes after drinking.
- Encourage patient to take prescribed medications for bladder spasticity.
- Teach intermittent self-catheterization, if necessary.
- Provide adequate fluids, dietary fiber, and a bowel-training program for bowel problems, including constipation, fecal impaction, and incontinence.

Managing Speech and Swallowing Difficulties

- Arrange for evaluation by a speech therapist. Reinforce this instruction and encourage patient and family to adhere to the plan.

- Reduce the risk for aspiration by careful feeding, proper positioning for eating, having suction apparatus available.

Improving Sensory and Cognitive Function

- Provide an eye patch or eyeglass occluder to block visual impulses of one eye when diplopia (double vision) occurs.
- Advise patient about free talking-book services.
- Refer patient and family to a speech-language pathologist when mechanisms of speech are involved.
- Provide compassion and emotional support to patient and family to adapt to new self-image and to cope with life disruption.
- Keep a structured environment; use lists and other memory aids to help patient maintain a daily routine.

Strengthening Coping Mechanisms

- Alleviate stress, and make referrals for counseling and support to minimize adverse effects of dealing with chronic illness.
- Provide information on the illness to patient and family.
- Help patient define problems and develop alternatives for management.

Improving Home Management

- Suggest modifications that allow independence in self-care activities at home (raised toilet seat, bathing aids, telephone modifications, long-handled comb, tongs, modified clothing).
- Maintain moderate environmental temperature; heat increases fatigue and muscle weakness and extreme cold may increase spasticity.

Promoting Sexual Function

Suggest a sexual counselor to assist patient and partner with sexual dysfunction (eg, erectile and ejaculatory disorders in men; orgasmic dysfunction and adductor spasms of the thigh muscles in women; bladder and bowel incontinence; urinary tract infections).

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE

- Teach patient and family about use of assistive devices, self-catheterization, and administration of medications.

- Assist patient and family to deal with new disabilities and changes as disease progresses.

CONTINUING CARE

- Refer for home health care nursing assistance as indicated.
- Assess changes in patient's health status and coping strategies, provide physical care to the patient if required, coordinate outpatient services and resources, and encourage health promotion, appropriate health screenings, and adaptation.
- Encourage the patient to contact the primary care provider if changes in the disease or its course are noted.
- Encourage patient to contact the local chapter of the National MS Society for services, publications, and contact with others who have MS.

Evaluation

Expected Patient Outcomes

- Reports improved physical mobility
- Remains free of injury
- Attains or maintains improved bladder and bowel control
- Participates in strategies to improve speech and swallowing
- Compensates for altered thought processes
- Demonstrates improved coping strategies
- Adheres to plan for home maintenance management
- Adapts to changes in sexual function

For more information, see Chapter 64 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Muscular Dystrophies

Muscular dystrophies are a group of chronic muscle disorders characterized by a progressive weakening and wasting of the skeletal or voluntary muscles. Most are inherited. The pathologic features include degeneration and loss of muscle fibers, variation in muscle fiber size, phagocytosis and regeneration, and replacement of muscle tissue by connective tissue. Differences

among these diseases center on the genetic pattern of inheritance, the muscles involved, the age at onset, and the rate of disease progression.

Clinical Manifestations

- Muscle wasting and weakness.
- Gastrointestinal tract problems: gastric dilation, rectal prolapse, and fecal impaction.
- Cardiomyopathy is a common complication in all forms of muscular dystrophy.

Medical Management

Treatment focuses on supportive care and prevention of complications. Supportive management is intended to keep patients active and functioning as normally as possible and to minimize functional deterioration. A therapeutic exercise program is individualized to prevent muscle tightness, contractures, and disuse atrophy. Night splints and stretching exercises are employed to delay joint contractures (especially ankles, knees, and hips). Braces may be used to compensate for muscle weakness. The patient may be fitted with an orthotic jacket to improve sitting stability, reduce trunk deformity, and support cardiovascular status. Spinal fusion may be performed to maintain spinal stability. All upper respiratory infections and fractures from falls are treated vigorously to minimize immobilization and to prevent joint contractures. Advise genetic counseling because of the genetic nature of this disease. Also advise patient to consult with appropriate caregivers for dental and speech problems and gastrointestinal tract problems.

Nursing Management

The goals are to maintain function at optimal levels and enhance the quality of life.

- Attend to patient's physical requirements and emotional and developmental needs.
- Actively involve patient and family in decision making, including end-of-life decisions.
- During hospitalization for treatment of complications, assess knowledge and expertise of patient and family responsible for

giving care in the home. Assist patient and family to maintain coping strategies used at home while in the hospital.
- Provide patient and family with information about the disorder, its anticipated course, and care and management strategies that will optimize patient's growth and development and physical and psychological status.
- Communicate recommendations to all members of the health care team so that they work toward common goals.
- Encourage patient to use self-help devices to achieve greater independence; assist adolescents to make transition to adulthood. Encourage education and job tracking as appropriate.
- When teaching family to monitor patient for respiratory problems, give information regarding appropriate respiratory support, such as negative-pressure devices and positive-pressure ventilators.
- Encourage range-of-motion exercises to prevent disabling contractures.
- Assist family in adjusting home environment to maximize functional independence; patient may require manual or electric wheelchair, gait aids, seating systems, bathroom equipment, lifts, ramps, and additional activity of daily living aids.
- Assess for signs of depression, prolonged anger, bargaining, or denial and help patient to cope and adapt to chronic disease. Arrange for referral to a psychiatric nurse clinician or other mental health professional if indicated to assist patient to cope and adapt to the disease.
- Provide a hopeful, supportive, and nurturing environment.

For more information, see Chapter 65 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Musculoskeletal Trauma (Contusions, Strains, Sprains, and Joint Dislocations)

Injury to one part of the musculoskeletal system results in malfunction of adjacent muscles, joints, and tendons. The

type and severity of injury affects the mobility of the injured area. Treatment of injury to the musculoskeletal system involves providing support to the injured part until healing is complete.

Contusions, Strains, and Sprains

A contusion is a soft tissue injury produced by blunt force (eg, a blow, kick, or fall). Many small blood vessels rupture and bleed into soft tissues (ecchymosis or bruising). A hematoma develops when the bleeding is sufficient to cause an appreciable collection of blood. Most contusions resolve in 1 to 2 weeks. A strain is a "muscle pull" from overuse, overstretching, or excessive stress. A sprain is an injury to the ligaments surrounding a joint, caused by a twisting motion or hyperextension (forcible) of a joint. A torn ligament loses its stabilizing ability. Blood vessels rupture and edema occurs.

Joint Dislocations

A dislocation of a joint is a condition in which the articular surfaces of the bones forming the joint are no longer in anatomic contact. In complete dislocation, the bones are literally "out of joint." A subluxation is a partial dislocation of the articulating surfaces. Traumatic dislocations are orthopedic emergencies because the associated joint structures, blood supply, and nerves are displaced and may be entrapped with extensive pressure on them. If a dislocation or subluxation is not treated promptly, avascular necrosis (tissue death due to anoxia and diminished blood supply) may occur.

Clinical Manifestations

- Contusion: local symptoms (pain, swelling, and discoloration)
- Strain: soreness or sudden pain with local tenderness on muscle use and isometric contraction
- Sprain: tenderness of the joint, painful movement; increased disability and pain the first 2 to 3 hours after injury because of associated swelling and bleeding
- Dislocation or subluxation: acute pain, change in positioning of the joint, shortening of the extremity, deformity, and decreased mobility

Assessment and Diagnostic Methods

X-ray examination is used to evaluate for any bone injury.

Medical Management

Treatment of injury of the musculoskeletal system involves providing support for the injured part until healing is complete. Treatment of contusions, strains, and sprains consists of rest, applying ice, applying a compression bandage, and elevating the affected part (RICE: rest, ice, compression, elevation).

- Severe sprains may require 1 to 3 weeks of immobilization before protected exercises are initiated.
- Strains and sprains take weeks or months to heal. Splinting may be used to prevent reinjury.
- With a dislocation, the affected joint needs to be immobilized while the patient is transported to the hospital.
- The dislocation is promptly reduced (ie, displaced parts brought into normal position) to preserve joint function. Analgesia, muscle relaxants, and possibly anesthesia are used to facilitate closed reduction.
- The joint is immobilized by bandages, splints, casts, or traction and is maintained in a stable position.
- After reduction, gentle, progressive, active, and passive movement three or four times a day is begun to preserve range of motion and restore strength.
- The joint is supported between exercise sessions.

Nursing Management

- Frequently assess and evaluate the injury, and complete full neurovascular assessment.
- Educate the patient and family regarding proper exercises and activities as well as danger signs and symptoms to look for, such as increasing pain (even with analgesics), "numbness or tingling," and increased edema in the extremity.
- Ice or some form of moist or dry cold is applied intermittently for 20 to 30 minutes during the first 24 to 48 hours after injury to produce vasoconstriction, which decreases bleeding, edema, and discomfort. Avoid excessive cold because it could cause skin and tissue damage.

- An elastic compression bandage controls bleeding, reduces edema, and provides support for the injured tissues.
- Elevation controls the swelling. If the sprain is severe (torn muscle fibers and disrupted ligaments), surgical repair or cast immobilization may be necessary so that the joint will not lose its stability.
- After the acute inflammatory stage (eg, 24 to 48 hours after injury), heat may be applied intermittently (for 15 to 30 minutes, four times a day) to relieve muscle spasm and to promote vasodilation, absorption, and repair.
- Depending on the severity of injury, progressive passive and active exercises may begin in 2 to 5 days.

For more information, see Chapter 69 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Myasthenia Gravis

Myasthenia gravis (MG) is an autoimmune disorder affecting the myoneural junction. Antibodies directed at the acetylcholine receptor sites impair transmission of impulses across the myoneural junction. Therefore, fewer receptors are available for stimulation, resulting in voluntary muscle weakness that escalates with continued activity. Women are affected more frequently than men, and they tend to develop the disease at an earlier age (20 to 40 years of age, versus 60 to 70 years for men).

Clinical Manifestations

MG is purely a motor disorder with no effect on sensation or coordination.

- Initial manifestation involves ocular muscles (eg, diplopia and ptosis)
- Weakness of the muscles of the face (resulting in a bland facial expression) and throat (bulbar symptoms) and generalized weakness
- Laryngeal involvement: dysphonia (voice impairment) and increases the risk of choking and aspiration

- Generalized weakness that affects all extremities and the intercostal muscles, resulting in decreasing vital capacity and respiratory failure

Assessment and Diagnostic Findings

- Injection of edrophonium (Tensilon) is used to confirm the diagnosis (have atropine available for side effects). Improvement in muscle strength represents a positive test and usually confirms the diagnosis.
- MRI may demonstrate an enlarged thymus gland.
- Tests include serum analysis for acetylcholine receptor and electromyography (EMG) to measure electrical potential of muscle cells.

Complications

A myasthenic crisis is an exacerbation of the disease process characterized by severe generalized muscle weakness and respiratory and bulbar weakness that may result in respiratory failure. Crisis may result from disease exacerbation or a specific precipitating event. The most common precipitator is respiratory infection; others include medication change, surgery, pregnancy, and medications that exacerbate myasthenia. A cholinergic crisis caused by overmedication with cholinesterase inhibitors is rare; atropine sulfate should be on hand to treat bradycardia or respiratory distress. Neuromuscular respiratory failure is the critical complication in myasthenic and cholinergic crises.

Medical Management

Management of MG is directed at improving function and reducing and removing circulating antibodies. Therapeutic modalities include administration of anticholinesterase medications and immunosuppressive therapy, plasmapheresis, and thymectomy. There is no cure for MG; treatments do not stop the production of the acetylcholine receptor antibodies.

Pharmacologic Therapy

Pyridostigmine bromide (Mestinon) is the first line of therapy. It provides symptomatic relief by inhibiting the breakdown of acetylcholine and increasing the relative concentration of available acetylcholine at the neuromuscular junction.

If pyridostigmine bromide does not improve muscle strength and control fatigue, the next agents used are the immunomodulating drugs. Immunosuppressive therapy aims to reduce the production of antireceptor antibody or remove it directly by plasma exchange. Corticosteroids are given to suppress the immune response, decreasing the amount of blocking antibody.

Other Therapy

Plasma exchange (plasmapheresis) produces a temporary reduction in the titer of circulating antibodies. Thymectomy (surgical removal of the thymus) produces substantial remission, especially in patients with tumor or hyperplasia of the thymus gland.

Nursing Management

- Educate patient about self-care, including medication management, energy conservation, strategies to help with ocular manifestations, and prevention and management of complications.
- Ensure patient understands the actions of the medications and emphasize the importance of taking them on schedule and the consequences of delaying medication; stress the signs and symptoms of myasthenic and cholinergic crises.
- Encourage patient to determine the best times for daily dosing by keeping a diary to determine fluctuation of symptoms and to learn when the medication is wearing off.

NURSING ALERT

Maintenance of stable blood levels of anticholinesterase medications is imperative to stabilize muscle strength. Therefore, the anticholinesterase medications must be administered on time. Any delay in administration of medications may exacerbate muscle weakness and make it impossible for the patient to take medications orally.

- Teach the patient strategies to conserve energy (eg, if the patient lives in a two-story home, suggest that frequently used items such as hygiene products, cleaning products, and snacks be kept on each floor to minimize travel between floors).

- Help the patient identify the optimal times for rest throughout the day.
- Encourage the patient to apply for a handicapped license plate to minimize walking from parking spaces and to schedule activities to coincide with peak energy and strength levels.
- Instruct patient to schedule mealtimes to coincide with the peak effects of anticholinesterase medication; encourage rest before meals to reduce muscle fatigue; advise the patient to sit upright during meals, with the neck slightly flexed to facilitate swallowing.
- Encourage meals of soft foods in gravy or sauces; if choking occurs frequently, suggest pureed food with a puddinglike consistency. Supplemental feedings may be necessary in some patients to ensure adequate nutrition.
- Ensure suction is available at home and that the patient and family are instructed in its use.
- Instruct the patient to tape the eyes closed for short intervals and to regularly instill artificial tears; patients who wear eyeglasses can have "crutches" attached to help lift the eyelids; patching of one eye can help with double vision.
- Remind the patient of the importance of maintaining health promotion practices and of following health care screening recommendations.
- Encourage patient to note and avoid factors that exacerbate symptoms and potentially cause crisis: emotional stress, infections (particularly respiratory infections), vigorous physical activity, some medications, and high environmental temperature.
- Refer patient to the MG Foundation of America, which can provide support groups, services, and educational materials for patients and families.

For more information, see Chapter 64 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Myocarditis

Myocarditis is an inflammatory process involving the myocardium. When the muscle fibers of the heart are damaged,

life is threatened. Myocarditis usually results from an infectious process (eg, viral, bacterial, rickettsial, fungal, parasitic, metazoal, protozoal, spirochetal). It may develop in patients receiving immunosuppressive therapy or those with infective endocarditis, Crohn disease, or systemic lupus erythematosus. Myocarditis can cause heart dilation, thrombi on the heart wall (mural thrombi), infiltration of circulating blood cells around the coronary vessels and between the muscle fibers, and degeneration of the muscle fibers themselves.

Clinical Manifestations

- Clinical features depend on the type of infection, degree of myocardial damage, and capacity of the myocardium to recover.
- Symptoms may be moderate, mild, or absent.
- Patient may report fatigue and dyspnea, palpitations, and occasional discomfort in the chest and upper abdomen.
- The most common symptoms are flulike.
- Patient may develop severe congestive heart failure or sustain sudden cardiac death.

Assessment and Diagnostic Findings

Cardiac enlargement, faint heart sounds (especially S_1), a gallop rhythm, or a systolic murmur may be found on clinical examination. Cardiac MRI with contrast may be diagnostic and can guide clinicians to sites for endocardial biopsies.

Medical Management

- Patients are given specific treatment for the underlying cause if it is known (eg, penicillin for hemolytic streptococci) and are placed on bed rest to decrease cardiac workload, myocardial damage, and complications.
- In young patients, activities, especially athletics, should be limited for a 6-month period or at least until heart size and function have returned to normal; physical activity is increased slowly.
- If heart failure or dysrhythmia develops, management is essentially the same as for all causes of heart failure and dysrhythmias; beta-blockers are avoided.

Nursing Management

- Assess for resolution of tachycardia, fever, and any other clinical manifestations.
- Focus cardiovascular assessment on signs and symptoms of heart failure and dysrhythmias; patients with dysrhythmias should have continuous cardiac monitoring with personnel and equipment readily available to treat life-threatening dysrhythmias.

NURSING ALERT

Patients with myocarditis are sensitive to digitalis. Nurses must closely monitor these patients for digitalis toxicity, which is evidenced by dysrhythmia, anorexia, nausea, vomiting, headache, and malaise.

- Use graduated compression stockings and passive and active exercises because embolization from venous thrombosis and mural thrombi can occur, especially in patients on bed rest.

For more information, see Chapter 29 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.



N

Nephritic Syndrome, Acute

Acute nephritic syndrome is the clinical manifestation of glomerular inflammation. Glomerulonephritis is an inflammation of the glomerular capillaries that can occur in acute and chronic forms.

Pathophysiology

Antigen–antibody complexes in the blood are trapped in the glomeruli, stimulating inflammation and producing injury to the kidney. Glomerulonephritis may also follow impetigo (infection of the skin) and acute viral infections (upper respiratory tract infections, mumps, and varicella zoster virus, Epstein–Barr virus, hepatitis B, and human immunodeficiency virus [HIV] infections).

Clinical Manifestations

- Primary presenting features of an acute glomerular inflammation are hematuria, edema, azotemia, an abnormal concentration of nitrogenous wastes in the blood, and proteinuria or excess protein in the urine (urine may appear cola-colored).
- Some degree of edema and hypertension is present in most patients.
- Blood urea nitrogen (BUN) and serum creatinine levels may increase as urine output decreases; anemia may be present.
- In the more severe form of the disease, headache, malaise, and flank pain may occur.
- Elderly patients may have circulatory overload: dyspnea, engorged neck veins, cardiomegaly, and pulmonary edema.

Assessment and Diagnostic Findings

- Primary presenting feature: microscopic or gross (macroscopic) hematuria.
- Patients with an IgA nephropathy have an elevated serum IgA and low to normal complement levels.

- Electron microscopy and immunofluorescent analysis help identify the nature of the lesion; however, a kidney biopsy may be needed for definitive diagnosis.

Medical Management

Management consists primarily of treating symptoms, attempting to preserve kidney function, and treating complications promptly. Treatment may include using corticosteroids, managing hypertension, and controlling proteinuria. Pharmacologic therapy depends on the cause of acute glomerulonephritis. If residual streptococcal infection is suspected, penicillin is the agent of choice; however, other antibiotic agents may be prescribed. Dietary protein is restricted when renal insufficiency and nitrogen retention (elevated BUN) develop. Sodium is restricted when the patient has hypertension, edema, and heart failure.

Nursing Management

Although most patients with acute uncomplicated glomerulonephritis are cared for as outpatients, nursing care is important in every setting.

Providing Care in the Hospital

- Give patient carbohydrates liberally to provide energy and reduce the catabolism of protein.
- Carefully measure and record intake and output; give fluids on the basis of the patient's fluid losses and daily body weight.
- Provide patient education about the disease process and explanations of laboratory and other diagnostic tests.
- Prepare the patient for safe and effective self-care at home.

Promoting Home- and Community-Based Care

Teaching Patients Self-Care

- Direct patient education toward symptom management and monitoring for complications.
- Review fluid and diet restrictions with the patient to avoid worsening of edema and hypertension.
- Instruct the patient verbally and in writing to notify the physician if symptoms of renal failure occur (eg, fatigue, nausea, vomiting, diminishing urine output) or at the first sign of any infection.

Continuing Care

- Stress to the patient the importance of follow-up evaluations of blood pressure, urinalysis for protein, and BUN and serum creatinine levels to determine if the disease has progressed.
- Refer for home care, if indicated, to assess the patient's progress and detect early signs and symptoms of renal insufficiency.
- Review with the patient the dosage, desired actions, and adverse effects of medications and the precautions to be taken.

For more information, see Chapter 44 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Nephrotic Syndrome

Nephrotic syndrome is a primary glomerular disease characterized by proteinuria, hypoalbuminemia, diffuse edema, high serum cholesterol, and hyperlipidemia. It is seen in any condition that seriously damages the glomerular capillary membrane, causing increased glomerular permeability with loss of protein in the urine. It occurs with many intrinsic renal diseases and systemic diseases that cause glomerular damage. It is not a specific glomerular disease but a constellation of clinical findings that result from the glomerular damage.

Clinical Manifestations

- Major manifestation is edema. It is usually soft, pitting, and commonly occurs around the eyes (periorbital), in dependent areas (sacrum, ankles, and hands), and in the abdomen (ascites).
- Malaise, headache, irritability.

Assessment and Diagnostic Findings

- Protein electrophoresis and immunoelectrophoresis to determine type of proteinuria exceeding 3.5 g/day.
- Urine may contain increased white blood cells and granular and epithelial casts.

- Needle biopsy of the kidney for histologic examination to confirm diagnosis.

Medical Management

Treatment is focused on treating the underlying disease state causing proteinuria, slowing progression of chronic kidney disease (CKD), and relieving symptoms. Typical treatment includes diuretics for edema, angiotensin-converting enzyme (ACE) inhibitors to reduce proteinuria, and lipid-lowering agents for hyperlipidemia.

Nursing Management

- In the early stages, nursing management is similar to that of acute glomerulonephritis.
- As the disease worsens, management is similar to that of end-stage renal disease.
- Provide adequate instruction about the importance of following all medication and dietary regimens so that the patient's condition can remain stable as long as possible.
- Convey to the patient the importance of communicating any health-related change to their health care providers as soon as possible so that appropriate medication and dietary changes can be made before further changes occur within the glomeruli.

For more information, see Chapter 44 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.



O

Obesity, Morbid

Morbid obesity is the term applied to people whose body weight is more than 100 lb over the ideal body weight, those who weigh more than twice their ideal body weight, or those whose body mass index (BMI) exceeds 30 kg/m^2 (BMI is the patient's weight in pounds divided by the patient's height in inches squared, multiplied by 704.5). Patients with morbid obesity are at higher risk for health complications, such as diabetes, heart disease, stroke, hypertension, gallbladder disease, osteoarthritis (OA), sleep apnea and other breathing problems, and some forms of cancer (uterine, breast, colorectal, kidney, and gallbladder). They frequently suffer from low self-esteem, impaired body image, and depression.

Medical Management

A weight loss diet in conjunction with behavioral modification and exercise is usually unsuccessful. Depression can be treated using an antidepressant. Some physicians recommend acupuncture and hypnosis before recommending surgery.

Pharmacologic Management

- Sibutramine HCl (Meridia) decreases appetite by inhibiting the reuptake of serotonin and norepinephrine. Check drug precautions.
- Orlistat (Xenical) reduces caloric intake by inhibiting digestion of triglycerides. Review side effects; multivitamin is usually recommended.
- Rimonabant (Acomplia) blocks the cannabinoid-1 receptor that is thought to play an important role in some aspects of human metabolism, including obesity.

Surgical Management

- Bariatric surgery (surgery for morbid obesity) includes gastric restriction procedures such as gastric bypass and vertical banded gastroplasty (performed laparoscopically or by open surgical technique).
- Body contouring after weight loss involves lipoplasty to remove fat deposits or a panniculectomy to remove excess abdominal skinfolds.

Nursing Management

Nursing management focuses on care of the patient after surgery. General postoperative nursing care is similar to that for a patient recovering from a gastric resection, but with great attention given to the risks of complications associated with morbid obesity.

- Monitor for complications that may occur in the immediate postoperative period: peritonitis, stomal obstruction, stomal ulcers, atelectasis and pneumonia, thromboembolism, and metabolic imbalances resulting from prolonged vomiting and diarrhea or altered gastrointestinal (GI) function.
- After bowel sounds have returned and oral intake is resumed, provide patient six small feedings consisting of a total of 600 to 800 calories per day, and encourage fluids to prevent dehydration.
- Instruct the patient to report excessive thirst or concentrated urine, both of which are indications of dehydration.
- Help patient modify his or her eating behaviors and cope with changes in body image.
- Explain that noncompliance by eating too much or too fast or eating high-calorie liquids and soft foods results in vomiting and painful esophageal distention.
- Discuss dietary instructions and the need for physical activity before discharge.
- Emphasize the importance of routine follow-up outpatient appointments to ensure medical management of any side effects, which may include increased risk of gallstones, nutritional and vitamin deficiencies, and potential to regain weight.

- For patients who undergo laparoscopic or open Roux-en-Y procedures and have one or more Jackson Pratt drains, teach the patient and family how to empty, measure, and record the amount of drainage.

For more information, see Chapter 37 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Osteoarthritis (Degenerative Joint Disease)

OA, also known as degenerative joint disease or osteoarthrosis, is the most common and most frequently disabling joint disorder. It is characterized by a progressive loss of joint cartilage. Besides age, risk factors for OA include congenital and developmental disorders of the hip, obesity, previous joint damage, repetitive use (occupational or recreational), anatomic deformity, and genetic susceptibility. OA has been classified as primary (idiopathic) and secondary (resulting from previous joint injury or inflammatory disease). Obesity, in addition to being a risk factor for OA, increases symptoms of the disease. OA peaks between the fifth and sixth decades of life.

Clinical Manifestations

- Pain, stiffness, and functional impairment are primary clinical manifestations.
- Stiffness is most common in the morning after awakening. It usually lasts less than 30 minutes and decreases with movement.
- Functional impairment is due to pain on movement and limited joint motion when structural changes develop.
- OA occurs most often in weight-bearing joints (hips, knees, cervical and lumbar spine); finger joints are also involved.
- Bony nodes may be present (painless unless inflamed).

Assessment and Diagnostic Findings

- X-ray study shows narrowing of joint space and osteophytes (spurs) at the joint margins and on the subchondral bone. These two findings together are sensitive and specific.

- There is a weak correlation between joint pain and synovitis.
- Blood tests are not useful in the diagnosis of this disorder.

Medical Management

Management focuses on slowing and treating symptoms because there is no treatment available that stops the degenerative joint disease process.

Prevention

- Weight reduction
- Prevention of injuries
- Perinatal screening for congenital hip disease
- Ergonomic modifications

Conservative Measures

- Heat, weight reduction, joint rest, and avoidance of joint overuse
- Orthotic devices to support inflamed joints (splints, braces)
- Isometric and postural exercises, and aerobic exercise
- Occupational and physical therapy

Pharmacologic Therapy

- Acetaminophen; nonsteroidal anti-inflammatory drugs (NSAIDs)
- COX-2 enzyme blockers (for patients with increased risk for GI bleeding)
- Opioids and intra-articular corticosteroids
- Topical analgesics such as capsaicin and methyl salicylate
- Other therapeutic approaches: glucosamine and chondroitin; viscosupplementation (intra-articular injection of hyaluronic acid)

Surgical Management

Use when pain is severe and function is lost.

- Osteotomy
- Joint arthroplasty (replacement)

Nursing Management

The nursing care of the patient with OA is generally the same as the basic care plan for the patient with rheumatic disease (see Arthritis, Rheumatoid). Managing pain and optimizing functional ability are the major goals of nursing intervention,

and helping patients understand their disease process and symptom pattern is critical to a plan of care.

- Assist patients with management of obesity (weight loss and an increase in aerobic activity) and other health problems or diseases, if applicable.
- Refer patient for physical therapy or to an exercise program. Exercises such as walking should be begun in moderation and increased gradually.
- Provide and encourage use of canes or other assistive devices for ambulation as indicated.

For more information, see Chapter 54 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Osteomalacia

Osteomalacia is a metabolic bone disease characterized by inadequate mineralization of bone. The primary defect is a deficiency in activated vitamin D (calcitriol), which promotes calcium absorption from the GI tract and facilitates mineralization of bone. Osteomalacia may result from failed calcium absorption (malabsorption) or excessive loss of calcium (celiac disease, biliary tract obstruction, chronic pancreatitis, bowel resection) and loss of vitamin D (liver and kidney disease). Additional risk factors include severe renal insufficiency, hyperparathyroidism, prolonged use of antiseizure medication, malnutrition, and insufficient vitamin D (eg, from inadequate dietary intake or inadequate sunlight exposure).

Clinical Manifestations

- Bone pain and tenderness.
- Muscle weakness from calcium deficiency.
- Waddling or limping gait; legs bowed in more advanced disease.
- Pathologic fractures.
- Softened vertebrae become compressed, shortening patient's trunk and deforming thorax (kyphosis).
- Weakness and unsteadiness, presenting risk of falls and fractures.

Assessment and Diagnostic Findings

- X-ray studies, bone biopsy shows increased osteoid (demineralized bone matrix).
- Laboratory studies show low serum calcium and phosphorus levels, moderately elevated alkaline phosphatase level, decreased urine calcium and creatinine excretion.

Gerontologic Considerations

Promote adequate intake of calcium and vitamin D and a nutritious diet in disadvantaged elderly patients. Encourage patient to spend time in the sun. Reduce incidence of fractures with prevention, identification, and management of osteomalacia. When osteomalacia is combined with osteoporosis, the incidence of fracture increases.

Management

Physical, psychological, and pharmaceutical measures are used to reduce the patient's discomfort and pain.

- Underlying cause is corrected when possible (eg, diet modifications, vitamin D and calcium supplements, sunlight).
- If osteomalacia is caused by malabsorption, increased doses of vitamin D, along with supplemental calcium, are usually prescribed.
- Exposure to sunlight may be recommended.
- If osteomalacia is dietary in origin, a diet with adequate protein and increased calcium and vitamin D is provided.
- Long-term monitoring is undertaken to ensure stabilization or reversal.
- Orthopedic deformities may be treated with braces or surgery (osteotomy).

For more information, see Chapter 68 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Osteomyelitis

Osteomyelitis is an infection of the bone. It may occur by extension of soft tissue infections, direct bone contamination (eg, bone surgery, gunshot wound), or hematogenous (bloodborne)

spread from other foci of infection. *Staphylococcus aureus* causes more than 50% of bone infections. Other pathogenic organisms frequently found include Gram-positive organisms that include streptococci and enterococci, followed by Gram-negative bacteria that include pseudomonas species. Patients at risk include poorly nourished, elderly, and patients who are obese; those with impaired immune systems and chronic illness (eg, diabetes); and those on long-term corticosteroid therapy or immunosuppressive agents. The condition may be prevented by prompt treatment and management of focal and soft tissue infections.

Clinical Manifestations

- When the infection is bloodborne, onset is sudden, occurring with clinical manifestations of sepsis (eg, chills, high fever, rapid pulse, and general malaise).
- Extremity becomes painful, swollen, warm, and tender.
- Patient may describe a constant pulsating pain that intensifies with movement (due to the pressure of collecting pus).
- When osteomyelitis is caused by adjacent infection or direct contamination, there are no symptoms of sepsis; the area is swollen, warm, painful, and tender to touch.

- Chronic osteomyelitis presents with a nonhealing ulcer that overlies the infected bone with a connecting sinus that will intermittently and spontaneously drain pus.

Assessment and Diagnostic Findings

- Acute osteomyelitis: Early x-ray films show only soft tissue swelling.
- Chronic osteomyelitis: X-ray shows large, irregular cavities, a raised periosteum, sequestra, or dense bone formations.
- Radioisotope bone scans and magnetic resonance imaging (MRI).
- Blood studies and blood cultures.

Medical Management

Initial goal is to control and arrest the infective process.

- General supportive measures (eg, hydration, diet high in vitamins and protein, correction of anemia) should be instituted; affected area is immobilized.

- Blood and wound cultures are performed to identify organisms and select the antibiotic.
- Intravenous antibiotic therapy is given around-the-clock; continues for 3 to 6 weeks.
- Antibiotic medication is administered orally (on empty stomach) when infection appears to be controlled; the medication regimen is continued for up to 3 months.
- Surgical debridement of bone is performed with irrigation; adjunctive antibiotic therapy is maintained.

NURSING PROCESS

The Patient With Osteomyelitis

Assessment

- Assess for risk factors (eg, older age, diabetes, long-term steroid therapy) and for previous injury, infection, or orthopedic surgery.
- Observe for guarded movement of infected area and generalized weakness due to systemic infection.
- Observe for swelling and warmth of affected area, purulent drainage, and elevated temperature.
- Note that patients with chronic osteomyelitis may have minimal temperature elevations, occurring in the afternoon or evening.

Nursing Diagnoses

- Acute pain related to inflammation and swelling
- Impaired physical mobility associated with pain, immobilization devices, and weight-bearing limitations
- Risk for extension of infection: bone abscess formation
- Deficient knowledge about treatment regimen

Planning and Goals

Major goals may include relief of pain, improved physical mobility within therapeutic limitations, control and eradication of infection, and knowledge of the treatment regimen.

Nursing Interventions

Relieving Pain

- Immobilize affected part with splint to decrease pain and muscle spasm.
- Monitor neurovascular status of affected extremity.
- Handle affected part with great care to avoid pain.
- Elevate affected part to reduce swelling and discomfort.
- Administer prescribed analgesic agents and use other techniques to reduce pain.

Improving Physical Mobility

- Teach the rationale for activity restrictions (bone is weakened by the infective process).
- Gently move the joints above and below the affected part through their range of motion.
- Encourage activities of daily living within physical limitations.

Controlling Infectious Process

- Monitor response to antibiotic therapy. Observe intravenous sites for evidence of phlebitis or infiltration. Monitor for signs of superinfection with long-term, intensive antibiotic therapy (eg, oral or vaginal candidiasis; loose or foul-smelling stools).
- If surgery was necessary, ensure adequate circulation (wound suction, elevation of area, avoidance of pressure on grafted area); maintain immobility as needed; comply with weight-bearing restrictions. Change dressings using aseptic technique to promote healing and prevent crosscontamination.
- Monitor general health and nutrition of patient.
- Provide a balanced diet high in protein to ensure positive nitrogen balance and promote healing; encourage adequate hydration.

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE

- Advise patient and family to adhere strictly to the therapeutic regimen of antibiotics and prevention of falls or other injury that could result in fracture.

- Teach patient and family how to maintain and manage the intravenous access site and intravenous administration equipment.
- Provide in-depth medication education (eg, drug name, dosage, frequency, administration rate, safe storage and handling, adverse reactions), including need for laboratory monitoring.
- Instruct patient to observe for and report elevated temperature, drainage, odor, signs of increased inflammation, adverse reactions, and signs of superinfection.

CONTINUING CARE

- Complete home assessment to determine patient's and family's ability to continue therapeutic regimen.
- Refer for a home care nurse if indicated.
- Monitor patient for response to treatment, signs and symptoms of superinfection, and adverse drug reactions.
- Stress importance of follow-up health care appointments and recommend age-appropriate health screening.

Evaluation

Expected Patient Outcomes

- Experiences pain relief
- Increases physical mobility
- Shows absence of infection
- Adheres to therapeutic plan

For more information, see Chapter 68 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Osteoporosis

Osteoporosis is characterized by reduced bone mass, deterioration of bone matrix, and diminished bone architectural strength. The rate of bone resorption is greater than the rate of bone formation. The bones become progressively porous,

brittle, and fragile, and they fracture easily. Multiple compression fractures of the vertebrae result in skeletal deformity (kyphosis). This kyphosis is associated with loss of height. Patients at risk include postmenopausal women and small-framed, nonobese Caucasian women.

Risk factors include inadequate nutrition, inadequate vitamin D and calcium, and lifestyle choices (eg, smoking, caffeine intake, and alcohol consumption); genetics; and lack of physical activity. Age-related bone loss begins soon after peak bone mass is achieved (in the fourth decade). Withdrawal of estrogens at menopause or oophorectomy causes decreased calcitonin and accelerated bone resorption, which continues during menopausal years. Immobility contributes to the development of osteoporosis. Secondary osteoporosis is the result of medications or other conditions and diseases that affect bone metabolism. Specific disease states (eg, celiac disease, hypogonadism) and medications (eg, corticosteroids, antiseizure medications) that place patients at risk need to be identified and therapies instituted to reverse the development of osteoporosis.

Assessment and Diagnostic Findings

- Osteoporosis is identified on routine x-ray films when there has been 25% to 40% demineralization.
- Dual-energy x-ray absorptiometry (DEXA; DXA) provides information about spine and hip bone mass and bone mineral density (BMD).
- Laboratory studies (eg, serum calcium, serum phosphate, serum alkaline phosphatase, urine calcium excretion, urinary hydroxyproline excretion, hematocrit, erythrocyte sedimentation rate [ESR]) and x-ray studies are used to exclude other diagnoses.

Gerontologic Considerations

Elderly people fall frequently as a result of environmental hazards, neuromuscular disorders, diminished senses and cardiovascular responses, and responses to medications. The patient and family need to be included in planning for care and preventive management regimens. For example, the home environment should be assessed for safety and elimination of

potential hazards (eg, scatter rugs, cluttered rooms and stairwells, toys on the floor, pets underfoot). A safe environment can then be created (eg, well-lighted staircases with secure hand rails, grab bars in the bathroom, properly fitting footwear).

Medical Management

- Adequate, balanced diet rich in calcium and vitamin D.
- Increased calcium intake during adolescence, young adulthood, and the middle years, or prescribe a calcium supplement with meals or beverages high in vitamin C.
- Regular weight-bearing exercise to promote bone formation (20 to 30 minutes aerobic exercise 3 days/week).
- Other medications: the bisphosphonates alendronate (Fosamax), risedronate (Actonel), ibandronate (Boniva), and zoledronic acid (Reclast); calcitonin (Miacalcin); selective estrogen receptor modulators (SERMs) such as raloxifene (Evista); teriparatide (Forteo).
- Osteoporotic compression fractures of the vertebrae are managed conservatively. Patients who have not responded to first-line approaches to the treatment of vertebral compression fracture can be considered for percutaneous vertebroplasty or kyphoplasty (injection of polymethylmethacrylate bone cement into the fractured vertebra, followed by inflation of a pressurized balloon to restore the shape of the affected vertebra).

NURSING PROCESS

The Patient With a Spontaneous Vertebral Fracture Related to Osteoporosis

Assessment

- To identify risk for and recognition of problems associated with osteoporosis, interview patient regarding family history, previous fractures, dietary consumption of calcium, exercise patterns, onset of menopause, and use of corticosteroids as well as alcohol, smoking, and caffeine intake.

- On physical examination, observe for fracture, kyphosis of thoracic spine, or shortened stature; explore any symptoms the patient is experiencing (eg, back pain, constipation).

Nursing Diagnoses

- Deficient knowledge of osteoporotic process and treatment regimen
- Acute pain related to fracture and muscle spasm
- Risk for constipation related to immobility or development of ileus
- Risk for injury: fracture related to osteoporotic bone

Planning and Goals

Major goals may include knowledge about osteoporosis and the treatment regimen, relief of pain, improved bowel elimination, and absence of additional fracture.

Nursing Interventions

Promoting Understanding of Osteoporosis and Treatment Regimen

- Focus on teaching patient about the factors influencing the development of osteoporosis, interventions to slow or arrest the process, and measures to relieve symptoms.
- Emphasize the need for sufficient calcium, vitamin D, and weight-bearing exercise to slow the progression of osteoporosis.
- Teach patient about medication therapy.

Relieving Pain

- Teach relief of back pain through bed rest and use of a firm, nonsagging mattress, knee flexion, intermittent local heat, and back rubs.
- Instruct patient to move the trunk as a unit and avoid twisting; encourage good posture and good body mechanics.
- Encourage patient to apply lumbosacral corset for immobilization and temporary support when out of bed.
- Encourage the patient to gradually resume activities as pain diminishes.

Improving Bowel Elimination

- Encourage patient to eat a high-fiber diet, increase fluids, and use prescribed stool softeners.

- Monitor patient's intake, bowel sounds, and bowel activity; ileus may develop if the vertebral collapse involves T10 to L2 vertebrae.

Preventing Injury

- Promote physical activity to strengthen muscles, prevent disuse atrophy, and retard progressive bone demineralization.
- Encourage patient to perform isometric exercises to strengthen trunk muscles.
- Encourage walking, good body mechanics, and good posture.
- Instruct patient to avoid sudden bending, jarring, and strenuous lifting.
- Encourage outdoor activity in the sunshine to enhance body's ability to produce vitamin D.

Evaluation

Expected Patient Outcomes

- Acquires knowledge about osteoporosis and treatment regimen
- Achieves pain relief
- Demonstrates normal bowel elimination
- Experiences no new fractures

For more information, see Chapter 68 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Otitis Media, Acute

Acute otitis media is an acute infection of the middle ear, usually lasting less than 6 weeks. The pathogens that cause acute otitis media are usually *Streptococcus pneumoniae*, *Haemophilus influenzae*, and *Moraxella catarrhalis*, which enter the middle ear after eustachian tube dysfunction caused by obstruction related to upper respiratory infections, inflammation of surrounding structures (eg, rhinosinusitis, adenoid hypertrophy), or allergic reactions (eg, allergic rhinitis). Bacteria can enter the eustachian tube from contaminated secretions in the

nasopharynx and the middle ear from a tympanic membrane perforation. The disorder is most common in children.

Clinical Manifestations

- Symptoms vary with the severity of the infection; usually unilateral in adults.
- Pain in and about the ear (otalgia) may be intense and relieved only after spontaneous perforation of the eardrum or after myringotomy.
- Fever; drainage from the ear, hearing loss.
- Tympanic membrane is erythematous and often bulging.
- Conductive hearing loss due to exudate in the middle ear.
- Even if the condition becomes subacute (3 weeks to 3 months) with purulent discharge, permanent hearing loss is rare.

Complications

- Perforation of the tympanic membrane may persist and develop into chronic otitis media.
- Secondary complications involve the mastoid (mastoiditis), meningitis, or brain abscess (rare).

Management

- With early and appropriate broad-spectrum antibiotic therapy, otitis media may clear with no serious sequelae. If drainage occurs, an antibiotic otic preparation may be prescribed.
- Outcome depends on efficacy of therapy (the prescribed dose of an oral antibiotic and the duration of therapy), the virulence of the bacteria, and the physical status of the patient.

Myringotomy (Tympanotomy)

If mild cases of otitis media are treated effectively, a myringotomy may not be necessary. If it is, an incision is made into the tympanic membrane to relieve pressure and to drain serous or purulent fluid from the middle ear. This painless procedure usually takes less than 15 minutes. If episodes of acute otitis media recur and there is no contraindication, a ventilating, or pressure-equalizing, tube may be inserted.

For more information, see Chapter 59 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Otitis Media, Chronic

Chronic otitis media results from repeated episodes of acute otitis media, causing irreversible tissue pathology and persistent perforation of the tympanic membrane. Chronic infections of the middle ear cause damage to the tympanic membrane, can destroy the ossicles, and can involve the mastoid.

Clinical Manifestations

- Symptoms may be minimal, with varying degrees of hearing loss and a persistent or intermittent foul-smelling otorrhea (discharge).
- Pain may be present if acute mastoiditis occurs; when mastoiditis is present, postauricular area is tender; erythema and edema may be present.
- Cholesteatoma (sac filled with degenerated skin and sebaceous material) may be present as a white mass behind the tympanic membrane visible through an otoscope. If untreated, the cholesteatoma continues to grow and destroys structures of the temporal bone, possibly causing damage to the facial nerve and horizontal canal and destruction of other surrounding structures. Auditory tests often show a conductive or mixed hearing loss.

Medical Management

- Careful suctioning and cleansing of the ear are done under microscopic guidance.
- Antibiotic drops are instilled or antibiotic powder is applied to treat purulent discharge.
- Tympanoplasty procedures (myringoplasty and more extensive types) may be performed to prevent recurrent infection, reestablish middle ear function, close the perforation, and improve hearing.
- Ossiculoplasty may be done to reconstruct the middle ear bones to restore hearing.
- Mastoidectomy may be done to remove cholesteatoma, gain access to diseased structures, and create a dry (noninfected) and healthy ear.

Nursing Management

See “Nursing Management” under “Mastoiditis” for additional information.

For more information, see Chapter 28 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth’s textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.



P

Pancreatitis, Acute

Pancreatitis (inflammation of the pancreas) is a serious disorder that can range in severity from a relatively mild, self-limiting disorder to a rapidly fatal disease that does not respond to any treatment.

Acute pancreatitis is commonly described as an autodigestion of the pancreas by the exocrine enzymes it produces, principally trypsin. Eighty percent of patients with acute pancreatitis have biliary tract disease or a history of long-term alcohol abuse. Other less common causes of pancreatitis include bacterial or viral infection, with pancreatitis occasionally developing as a complication of mumps virus. Many disease processes and conditions have been associated with an increased incidence of pancreatitis, including surgery on or near the pancreas, medications, hypercalcemia, and hyperlipidemia. Up to 10% of cases are idiopathic, and there is a small incidence of hereditary pancreatitis.

Mortality is high because of shock, anoxia, hypotension, or fluid and electrolyte imbalances. Attacks of acute pancreatitis may result in complete recovery, may recur without permanent damage, or may progress to chronic pancreatitis.

Clinical Manifestations

Severe abdominal pain is the major symptom.

- Pain in the midepigastrium may be accompanied by abdominal distention; a poorly defined, palpable abdominal mass; decreased peristalsis; and vomiting that fails to relieve the pain or nausea.
- Pain is frequently acute in onset (24 to 48 hours after a heavy meal or alcohol ingestion); may be more severe after meals and unrelieved by antacids.
- Patient appears acutely ill.

- Abdominal guarding; rigid or boardlike abdomen (generally an ominous sign, usually indicating peritonitis).
- Ecchymosis in the flank or around the umbilicus, which may indicate severe hemorrhagic pancreatitis.
- Nausea and vomiting, fever, jaundice, mental confusion, agitation.
- Hypotension related to hypovolemia and shock.
- May develop tachycardia, cyanosis, and cold, clammy skin.
- Acute renal failure common.
- Respiratory distress and hypoxia.
- May develop diffuse pulmonary infiltrates, dyspnea, tachypnea, and abnormal blood gas values.
- Myocardial depression, hypocalcemia, hyperglycemia, and disseminated intravascular coagulation (DIC).

Assessment and Diagnostic Findings

Diagnosis is based on history of abdominal pain, the presence of known risk factors, physical examination findings, and diagnostic findings (increased urine amylase level and white blood cell [WBC] count; hypocalcemia; transient hyperglycemia; glucosuria and increased serum bilirubin levels in some patients). X-rays of abdomen and chest, ultrasound, and contrast-enhanced computed tomography (CT) scan may be performed. Hematocrit and hemoglobin levels are used to monitor the patient for bleeding.

Serum amylase and lipase levels are most indicative (elevated within 24 hours; amylase returns to normal within 48 to 72 hours; lipase remains elevated for longer period). Peritoneal fluid is evaluated for increase in pancreatic enzymes.

Gerontologic Considerations

The mortality from acute pancreatitis increases with advancing age. Patterns of complications change with age (eg, the incidence of multiple organ failure increases with age). Close monitoring of major organ function (lungs and kidneys) is essential, and aggressive treatment is necessary to reduce mortality in the elderly.

Medical Management: Acute Phase

During the acute phase, management is symptomatic and directed toward preventing or treating complications.

- Oral intake is withheld to inhibit pancreatic stimulation and secretion of pancreatic enzymes.
- Parenteral nutrition (PN) is administered to the debilitated patient.
- Nasogastric suction is used to relieve nausea and vomiting and to decrease painful abdominal distention and paralytic ileus.
- Histamine-2 (H_2) receptor antagonists (cimetidine, ranitidine) or, sometimes, proton pump inhibitors are given to decrease hydrochloric acid secretion.
- Adequate pain medication, such as morphine, is administered. Antiemetic agents may be prescribed to prevent vomiting.
- Correction of fluid, blood loss, and low albumin levels is necessary.
- Antibiotics are administered if infection is present.
- Insulin is necessary if significant hyperglycemia occurs.
- Aggressive respiratory care is provided for pulmonary infiltrates, effusion, and atelectasis.
- Biliary drainage (drains and stents) results in decreased pain and increased weight gain.
- Surgical intervention may be performed for diagnosis, drainage, resection, or debridement.

Medical Management: Postacute Phase

- Antacids are given when the acute episode begins to resolve.
- Oral feedings low in fat and protein are initiated gradually.
- Caffeine and alcohol are eliminated.
- Medications (eg, thiazide diuretics, glucocorticoids, or oral contraceptives) are discontinued.

Nursing Management

Relieving Pain and Discomfort

- Administer analgesics as prescribed. Current recommendation for pain management is parenteral opioids, including morphine, hydromorphone, or fentanyl via patient-controlled analgesia or bolus.
- Frequently assess pain and the effectiveness of the pharmacologic interventions.
- Withhold oral fluids to decrease formation and secretion of secretin.

- Use nasogastric suctioning to remove gastric secretions and relieve abdominal distention; provides frequent oral hygiene and care to decrease discomfort from the nasogastric tube and relieve dryness of the mouth.
- Maintain patient on bed rest to decrease metabolic rate and to reduce secretion of pancreatic enzymes; report increased pain (may be pancreatic hemorrhage or inadequate analgesic dosage).
- Provide frequent and repeated but simple explanations about treatment; patient may have clouded sensorium from pain, fluid imbalances, and hypoxemia.

Improving Breathing Pattern

- Maintain patient in semi-Fowler's position to decrease pressure on diaphragm.
- Change position frequently to prevent atelectasis and pooling of respiratory secretions.
- Assess respiratory status frequently (pulse oximetry, arterial blood gas [ABG] values), and teach patient techniques of coughing and deep breathing and the use of incentive spirometry.

Improving Nutritional Status

- Assess nutritional status and note factors that alter the patient's nutritional requirements (eg, temperature elevation, surgery, drainage).
- Monitor laboratory test results and daily weights.
- Provide enteral nutrition or PN as prescribed.
- Monitor serum glucose level every 4 to 6 hours.
- Introduce oral feedings gradually as symptoms subside.
- Avoid heavy meals and alcoholic beverages.

Maintaining Skin Integrity

- Assess the wound, drainage sites, and skin carefully for signs of infection, inflammation, and breakdown.
- Carry out wound care as prescribed, and take precautions to protect intact skin from contact with drainage; consult with a wound–ostomy–continence nurse as needed to identify appropriate skin care devices and protocols.
- Turn patient every 2 hours; use of specialty beds may be indicated to prevent skin breakdown.

Monitoring and Managing Complications

Fluid and Electrolyte Disturbances

- Assess fluid and electrolyte status by noting skin turgor and moistness of mucous membranes.
- Weigh daily; measure all fluid intake and output.
- Assess for other factors that may affect fluid and electrolyte status, including increased body temperature and wound drainage.
- Observe for ascites, and measure abdominal girth.
- Administer intravenous (IV) fluids and blood or blood products to maintain volume and prevent or treat shock.
- Report decreased blood pressure, reduced urine output, and low serum calcium and magnesium.

Pancreatic Necrosis

- Transfer patient to intensive care unit for close monitoring.
- Administer prescribed fluids, medications, and blood products.
- Assist with supportive management, such as mechanical ventilation.

Shock and Multiple Organ Failure

- Monitor patient closely for early signs of neurologic, cardiovascular, renal, and respiratory dysfunction.
- Prepare for rapid changes in patient status, treatment, and therapies; respond quickly.
- Inform family of status and progress of patient; allow time with patient.

Promoting Home- and Community-Based Care

Teaching Patients Self-Care

- Provide patient and family with facts and explanations of the acute phase of illness; provide necessary repetition and reinforcement. Offer verbal and written instructions materials.
- Reinforce the need for a low-fat diet, avoidance of heavy meals, and avoidance of alcohol.
- Provide additional explanations on dietary modifications if biliary tract disease is the cause.

Continuing Care

- Refer for home care (often indicated).
- Assess the home situation and reinforce teaching.

- Provide information about resources and support groups, particularly if alcohol is the cause of acute pancreatitis.

For more information, see Chapter 40 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Pancreatitis, Chronic

Chronic pancreatitis is an inflammatory disorder characterized by progressive anatomic and functional destruction of the pancreas. Cells are replaced by fibrous tissue with repeated attacks of pancreatitis. The end result is obstruction of the pancreatic and common bile ducts and duodenum. In addition, there is atrophy of the epithelium of the ducts, inflammation, and destruction of the secreting cells of the pancreas. Alcohol consumption in Western societies and malnutrition worldwide are the major causes. The incidence of pancreatitis among alcoholics is 50 times the rate in the nondrinking population.

Pathophysiology

Long-term alcohol consumption causes hypersecretion of protein in pancreatic secretions, resulting in protein plugs and calculi within the pancreatic ducts. Alcohol has a direct toxic effect on the cells of the pancreas. Damage is more severe in patients with diets low in protein and very high or very low in fat. Smoking is another factor in the development of chronic pancreatitis. Because heavy drinkers usually smoke, it is difficult to separate the effects of the alcohol abuse and smoking.

Clinical Manifestations

- Recurring attacks of severe upper abdominal and back pain, accompanied by vomiting; opioids may not provide relief.
- Risk of addiction to opiates is high because of the severe pain.
- There may be continuous severe pain or dull, nagging, constant pain.

- Weight loss is a major problem.
- Altered digestion (malabsorption) of foods (proteins and fats) results in frequent, frothy, and foul-smelling stools with a high fat content (steatorrhea).
- As disease progresses, calcification of the gland may occur and calcium stones may form within the ducts.

Assessment and Diagnostic Methods

- Endoscopic retrograde cholangiopancreatography (ERCP) is the most useful study.
- Various imaging procedures, including magnetic resonance imaging (MRI), CT scans, and ultrasound.
- A glucose tolerance test evaluates pancreatic islet cell function.
- Steatorrhea is best confirmed by laboratory analysis of fecal fat content.

Medical Management

Treatment is directed toward preventing and managing acute attacks, relieving pain and discomfort, and managing exocrine and endocrine insufficiency of pancreatitis.

- Endoscopy to remove pancreatic duct stones, correct strictures, and drain cysts may be effective in selected patients to manage pain and relieve obstruction.
- Pain and discomfort are relieved with analgesics; yoga may be an effective nonpharmacologic method for pain reduction and for relief of other coexisting symptoms.
- Patient should avoid alcohol and foods that produce abdominal pain and discomfort. No other treatment will relieve pain if patient continues to consume alcohol.
- Diabetes mellitus resulting from dysfunction of pancreatic islet cells is treated with diet, insulin, or oral hypoglycemic agents. Patient and family are taught the hazard of severe hypoglycemia related to alcohol use.
- Pancreatic enzyme replacement therapy is instituted for malabsorption and steatorrhea.
- Surgery is done to relieve abdominal pain and discomfort, restore drainage of pancreatic secretions, and reduce frequency of attacks (pancreaticojejunostomy).

- Morbidity and mortality after surgical procedures are high because of patient's poor physical condition before surgery and concomitant occurrence of cirrhosis.

Nursing Management

See "Nursing Management" under "Pancreatitis, Acute," for treatment guidelines.

For more information, see Chapter 40 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Parkinson's Disease

Parkinson's disease is a slowly progressive degenerative neurologic disorder affecting the brain centers that are responsible for control and regulation of movement. The degenerative or idiopathic form of Parkinson's disease is the most common; there is also a secondary form with a known or suspected cause. The cause of the disease is mostly unknown but research suggests several causative factors (eg, genetics, atherosclerosis, viral infections, head trauma). The disease usually first appears in the fifth decade of life and is the fourth most common neurodegenerative disease.

Pathophysiology

Parkinson's disease is associated with decreased levels of dopamine resulting from destruction of pigmented neuronal cells in the substantia nigra in the basal ganglia region of the brain. The loss of dopamine stores in this area of the brain results in more excitatory neurotransmitters than inhibitory neurotransmitters, leading to an imbalance that affects voluntary movement. Cellular degeneration causes impairment of the extrapyramidal tracts that control semiautomatic functions and coordinated movements; motor cells of the motor cortex and the pyramidal tracts are not affected.

Clinical Manifestations

The cardinal signs of Parkinson's disease are tremor, rigidity, bradykinesia (abnormally slow movements), and postural instability.

- Resting tremors: a slow, unilateral turning of the forearm and hand and a pill-rolling motion of the thumb against the fingers; tremor at rest and increasing with concentration and anxiety.
- Resistance to passive limb movement characterizes muscle rigidity; passive movement may cause the limb to move in jerky increments (lead-pipe or cog-wheel movements); stiffness of the arms, legs, face, and posture are common; involuntary stiffness of passive extremity increases when another extremity is engaged in voluntary active movement.
- Impaired movement: Bradykinesia includes difficulty in initiating, maintaining, and performing motor activities.
- Loss of postural reflexes, shuffling gait, loss of balance (difficulty pivoting); postural and gait problems place the patient at increased risk for falls.

Other Characteristics

- Autonomic symptoms that include excessive and uncontrolled sweating, paroxysmal flushing, orthostatic hypotension, gastric and urinary retention, constipation, and sexual dysfunction.
- Psychiatric changes may include depression, dementia, delirium, and hallucinations; psychiatric manifestations may include personality changes, psychosis, and acute confusion.
- Auditory and visual hallucinations may occur.
- Hypokinesia (abnormally diminished movement) is common.
- As dexterity declines, micrographia (small handwriting) develops.
- Masklike facial expression.
- Dysphonia (soft, slurred, low-pitched, and less audible speech).

Assessment and Diagnostic Methods

- Patient's history and presence of two of the four cardinal manifestations: tremor, rigidity, bradykinesia, and postural changes.
- Positron emission tomography (PET) and single photon emission computed tomography (SPECT) scanning have been helpful in understanding the disease and advancing treatment.

- Medical history, presenting symptoms, neurologic examination, and response to pharmacologic management are carefully evaluated when making the diagnosis.

Medical Management

Goal of treatment is to control symptoms and maintain functional independence; no approach prevents disease progression.

Pharmacologic Therapy

- Levodopa (Larodopa) is the most effective agent and the mainstay of treatment.
- Anticholinergic agents to control tremor and rigidity.
- Amantadine hydrochloride (Symmetrel), an antiviral agent, to reduce rigidity, tremor, and bradykinesia.
- Dopamine agonists (eg, pergolide [Permax], bromocriptine mesylate [Parlodel]), ropinirole, and pramipexole are used to postpone the initiation of carbidopa and levodopa therapy.
- Monoamine oxidase inhibitors (MAOIs) to inhibit dopamine breakdown.
- Catechol-O-methyltransferase (COMT) inhibitors to reduce motor fluctuation.
- Antidepressant drugs.
- Antihistamine drugs to allay tremors.

Surgical Management

- Surgery to destroy a part of the thalamus (stereotactic thalamotomy and pallidotomy) to interrupt nerve pathways and alleviate tremor or rigidity.
- Transplantation of neural cells from fetal tissue of human or animal source to reestablish normal dopamine release.
- Deep brain stimulation with pacemakerlike brain implants to block nerve pathways in the brain that cause tremors.

NURSING PROCESS

The Patient with Parkinson's Disease

Assessment

The nurse notes how the disease affects the patient's activities of daily living and functional abilities and also observes for degree of disability and functional changes

that occur throughout the day, such as responses to medication. Observe the patient for quality of speech, loss of facial expression, swallowing deficits (drooling, poor head control, coughing), tremors, slowness of movement, weakness, forward posture, rigidity, evidence of mental slowness, and confusion. The following questions may facilitate observations:

- Do you have leg or arm stiffness?
- Have you experienced any irregular jerking of your arms or legs?
- Have you ever been "frozen" or rooted to the spot and unable to move?
- Does your mouth water excessively?
- Have you (or others) noticed yourself grimacing or making faces or chewing movements?
- What specific activities do you have difficulty doing?

Nursing Diagnoses

- Impaired physical mobility related to muscle rigidity and motor weakness
- Self-care deficits (eating, drinking, dressing, hygiene, and toileting) related to tremor and motor disturbance
- Constipation related to medication and reduced activity
- Imbalanced nutrition: less than body requirements related to tremor, slowness in eating, difficulty in chewing and swallowing
- Impaired verbal communication related to decreased speech volume, slowness of speech, inability to move facial muscles
- Ineffective coping related to depression and dysfunction due to disease progression

Other nursing diagnoses may include sleep pattern disturbances, deficient knowledge, risk for injury, risk for activity intolerance, disturbed thought processes, and compromised family coping.

Planning and Goals

Patient goals may include improving functional mobility, maintaining independence in activities of daily living

(ADLs), achieving adequate bowel elimination, attaining and maintaining acceptable nutritional status, achieving effective communication, and developing positive coping mechanisms.

Nursing Interventions

Improving Mobility

- Help patient plan progressive program of daily exercise to increase muscle strength, improve coordination and dexterity, reduce muscular rigidity, and prevent contractures.
- Encourage exercises for joint mobility (eg, stationary bike, walking).
- Instruct in stretching and range-of-motion exercises to increase joint flexibility.
- Encourage postural exercises to counter the tendency of the head and neck to be drawn forward and down. Teach patient to walk erect, watch the horizon, use a wide-based gait, swing arms with walking, walk heel-toe, and practice marching to music. Also encourage breathing exercises while walking and frequent rest periods to prevent fatigue or frustration.
- Advise patient that warm baths and massage help relax muscles.

Enhancing Self-Care Activities

- Encourage, teach, and support patient during activities of daily living.
- Modify environment to compensate for functional disabilities; adaptive devices may be useful.
- Enlist assistance of an occupational therapist as indicated.

Improving Bowel Elimination

- Establish a regular bowel routine.
- Increase fluid intake; eat foods with moderate fiber content.
- Provide raised toilet seat for easier toilet use.

Improving Swallowing and Nutrition

- Promote swallowing and prevent aspiration by having patient sit in upright position during meals.
- Provide semisolid diet with thick liquids that are easier to swallow.

- Teach patient to place the food on the tongue, close the lips and teeth, lift the tongue up and then back, and swallow; encourage patient to chew first on one side of the mouth and then on the other.
- Remind patient to hold head upright and to make a conscious effort to swallow to control buildup of saliva.
- Monitor patient's weight on a weekly basis.
- Provide supplementary feeding and, as disease progresses, tube feedings.
- Consult a dietitian regarding patient's nutritional needs.

Encouraging Use of Assistive Devices

- An occupational therapist can assist in identifying appropriate adaptive devices.
- Useful devices may include an electric warming tray that keeps food hot and allows the patient to rest during the prolonged time that it may take to eat; special utensils; a plate that is stabilized, a nonspill cup, and eating utensils.

Improving Communication

- Remind patient to face the listener, speak slowly and deliberately, and exaggerate pronunciation of words; a small electronic amplifier is helpful if the patient has difficulty being heard.
- Instruct patient to speak in short sentences and take a few breaths before speaking.
- Enlist a speech therapist to assist the patient.

Supporting Coping Abilities

- Encourage faithful adherence to exercise and walking program; point out activities that are being maintained through active participation.
- Provide continuous encouragement and reassurance.
- Assist and encourage patient to set achievable goals.
- Encourage patient to carry out daily tasks to retain independence.

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE. The education plan should include a clear explanation of the disease and the goal of assisting the patient to remain functionally independent as long as possible. Make every effort to explain the nature of

the disease and its management, to offset disabling anxieties and fears. The patient and family also need to know about the effects and side effects of medications and the importance of reporting side effects to the physician.

CONTINUING CARE

- Acknowledge the stress the family is under by living with a family member who has disabilities.
- Include caregiver in planning, and counsel caregiver to learn stress reduction techniques; remind caregiver to include others in the caregiving process, obtain periodic relief from responsibilities, and have a yearly health assessment.
- Allow family members to express feelings of frustration, anger, and guilt.
- Remind the patient and family members of the importance of addressing health promotion needs such as screening for hypertension and stroke risk assessments.

Evaluation

Expected Patient Outcomes

- Strives toward improved mobility
- Progresses toward self-care
- Maintains bowel function
- Attains improved nutritional status
- Achieves a method of communication
- Copes with effects of Parkinson's disease

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For more information, see Chapter 65 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Pelvic Infection (Pelvic Inflammatory Disease)

Pelvic inflammatory disease (PID) is an inflammatory condition of the pelvic cavity that may begin with cervicitis and may involve the uterus (endometritis), fallopian tubes (salpingitis), ovaries (oophoritis), pelvic peritoneum, or pelvic vascular

system. Infection, which may be acute, subacute, recurrent, or chronic and localized or widespread, is usually caused by bacteria but may be attributed to a virus, fungus, or parasite.

Pathophysiology

Pathogenic organisms usually enter the body through the vagina, pass through the cervical canal into the uterus, and may proceed to one or both fallopian tubes and ovaries, and into the pelvis. Infection most commonly occurs through sexual transmission but also may be caused by invasive procedures such as endometrial biopsy, surgical abortion, hysteroscopy, or insertion of an intrauterine device (IUD). The most common organisms involved are gonorrhea and chlamydia. The infection is usually bilateral. Risk factors include early age at first intercourse, multiple sexual partners, frequent intercourse, intercourse without condoms, sex with a partner with a sexually transmitted disease (STD), and a history of STDs or previous pelvic infection.

Clinical Manifestations

Symptoms may be acute and severe or low-grade and subtle.

- Vaginal discharge, dyspareunia, lower abdominal pelvic pain, and tenderness that occurs after menses; pain increases during voiding or defecating.
- Systemic symptoms include fever, general malaise, anorexia, nausea, headache, and possibly vomiting.
- Intense tenderness is noted on palpation of the uterus or movement of cervix (cervical motion tenderness) during pelvic examination.

Complications

- Pelvic or generalized peritonitis, abscesses, strictures, and fallopian tube obstruction
- Adhesions that eventually may require removal of the uterus, tubes, and ovaries
- Bacteremia with septic shock and thrombophlebitis with possible embolization

Medical Management

Broad-spectrum antibiotic therapy is instituted, with mild to moderate infections being treated on an outpatient basis. If

the patient is acutely ill, hospitalization may be required. Once hospitalized, the patient is placed on a regimen of bed rest, IV fluids, and IV antibiotic therapy. Nasogastric intubation and suction are used if ileus is present; vital signs are monitored. Treatment of sexual partners is necessary to prevent reinfection.

Nursing Management

Nursing measures include nutritional support of the patient and administration of antibiotic therapy as prescribed. Vital signs are assessed, as are characteristics of the disorder and the amount of vaginal discharge.

Comfort measures include applying heat safely to the abdomen and administering analgesic agents for pain relief. Another nursing intervention is prevention of transmission of infection to others by impeccable hand hygiene and use of barrier precautions and hospital guidelines for disposing of biohazardous articles (eg, pads).

Hospitalized patients must maintain bed rest. While in bed, they remain in semi-Fowler's position to facilitate dependent drainage. Before discharge, patients are taught self-care measures:

- Inform patient of the need for precautions and encourage her to take part in procedures to prevent infecting others and protect herself from reinfection. Stress that if a partner is not well known to her or has had other sexual partners recently, use of condoms is essential to prevent infection and sequelae.
- Explain how pelvic infections occur, how they can be controlled and avoided, and their signs and symptoms: abdominal pain, nausea and vomiting, fever, malaise, malodorous purulent vaginal discharge, and leukocytosis.
- Evaluate any pelvic pain or abnormal discharge, particularly after sexual exposure, childbirth, or pelvic surgery.
- Inform patient that IUDs may increase the risk for infection and that antibiotics may be prescribed.
- Instruct patient to use proper perineal care, wiping from front to back.
- Instruct patient to avoid douching, which can reduce natural flora.

- Teach patient to consult with health care provider if unusual vaginal discharge or odor is noted.
- Educate patient to maintain optimal health with proper nutrition, exercise, weight control, and safer sex practices (eg, using condoms, avoiding multiple sexual partners).
- Advise patient to have a gynecologic examination at least once a year.
- Provide information about signs and symptoms of ectopic pregnancy (pain, abnormal bleeding, faintness, dizziness, and shoulder pain).

For more information, see Chapter 47 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Pemphigus

Pemphigus is a group of serious diseases of the skin characterized by the appearance of bullae (blisters) on apparently normal skin and mucous membranes (mouth, vagina). Evidence indicates that pemphigus is an autoimmune disease involving immunoglobulin G (IgG).

Pathophysiology

A blister forms from the antigen–antibody reaction. The level of serum antibody is predictive of disease severity. The condition may be associated with ingestion of penicillin and captopril and with myasthenia gravis. Genetic factors may also play a role, with the highest incidence in those of Jewish or Mediterranean descent. It occurs with equal frequency in men and women in middle and late adulthood.

Clinical Manifestations

- Most cases present with oral lesions appearing as irregularly shaped erosions that are painful, bleed easily, and heal slowly.
- Skin bullae enlarge, rupture, and leave large, painful eroded areas with crusting and oozing.
- A characteristic odor emanates from the bullae and the exuding serum.

- Blistering or sloughing of uninvolved skin occurs when minimal pressure is applied (Nikolsky's sign).
- Eroded skin heals slowly, and eventually huge areas of the body are involved. Fluid and electrolyte imbalance and hypoalbuminemia may result from loss of fluid and protein.
- Bacterial superinfection is common.

Assessment and Diagnostic Findings

Diagnosis is confirmed by histologic examination of a biopsy specimen and immunofluorescent examination of the serum, which show circulating pemphigus antibodies.

Medical Management

Goals of therapy are to bring the disease under control as rapidly as possible, prevent loss of serum and development of secondary infection, and promote reepithelialization of the skin.

- Corticosteroids are administered in high doses to control the disease and keep the skin free of blisters. The high dosage level is maintained until remission is apparent. (Monitor for serious toxic effects from high-dose corticosteroid therapy.)
- Immunosuppressive agents (eg, azathioprine, cyclophosphamide, gold) may be prescribed to help control the disease and reduce the corticosteroid dose.
- Plasmapheresis is usually reserved for life-threatening cases.

NURSING PROCESS

The Patient with Pemphigus

Assessment

Disease activity is monitored by examining the skin for the appearance of new blisters as well as signs and symptoms of infection.

Diagnosis

Nursing Diagnoses

- Acute pain of oral cavity and skin related to blistering and erosions
- Impaired skin integrity related to ruptured bullae and denuded areas of skin

- Anxiety and ineffective coping related to appearance of skin and no hope of a cure
- Deficient knowledge about medications and side effects

Collaborative Problems/Potential Complications

- Infection and sepsis related to loss of protective barrier of skin and mucous membranes
- Fluid volume deficit and electrolyte imbalance related to loss of tissue fluids

Planning and Goals

The major goals may include relief of discomfort from lesions, skin healing, reduced anxiety and improved coping capacity, and absence of complications.

Nursing Interventions

Relieving Oral Discomfort

- Provide meticulous oral hygiene for cleanliness and regeneration of epithelium.
- Provide frequent prescribed mouthwashes to rinse mouth of debris. Avoid commercial mouthwashes.
- Keep lips moist with lanolin, petrolatum, or lip balm.
- Humidify environmental air.

Enhancing Skin Integrity and Relieving Discomfort

- Provide cool, wet dressings or baths (protective and soothing).
- Premedicate with analgesic agents before skin care is initiated.
- Dry skin carefully and dust with nonirritating powder.
- Avoid use of tape, which may produce more blisters.
- Keep patient warm to avoid hypothermia.

  See "Nursing Management" under "Burn Injury" for additional information.

Reducing Anxiety

- Demonstrate a warm and caring attitude; allow patient to express anxieties, discomfort, and feelings of hopelessness.
- Educate patient and family regarding the disease.
- Refer to psychological counseling as needed.

Monitoring and Managing Potential Complications

- Keep skin clean to eliminate debris and dead skin and to prevent infection.
- Inspect oral cavity for secondary infections and *Candida albicans* infection from high-dose steroid therapy; report if noted.
- Investigate all “trivial” complaints or minimal changes, because corticosteroids mask typical symptoms of infection.
- Monitor for temperature fluctuations and chills; monitor secretions and excretions for changes suggestive of infection.
- Administer antimicrobial agents as prescribed, and note response to treatment.
- Employ effective hand drying techniques; use protective isolation measures and standard precautions.
- Avoid environmental contamination (have housekeeping department dust with a damp cloth and wash floor with a wet mop).

Achieving Fluid and Electrolyte Balance

- Administer saline infusion for sodium chloride depletion.
- Administer blood component therapy to maintain blood volume and hemoglobin and plasma protein concentrations if necessary.
- Monitor serum albumin, hemoglobin, hematocrit, and protein levels.
- Encourage adequate oral intake.
- Provide cool, nonirritating fluids for hydration; provide small, frequent feedings of high-protein, high-calorie foods and snacks.
- Provide PN if patient cannot eat.

Evaluation

Expected Patient Outcomes

- Achieves relief from pain of oral lesions
- Achieves skin healing
- Experiences decreased anxiety and increased ability to cope
- Experiences no complications

For more information, see Chapter 56 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Peptic Ulcer

A peptic ulcer is an excavation formed in the mucosal wall of the stomach, pylorus, duodenum, or esophagus. It is frequently referred to as a gastric, duodenal, or esophageal ulcer, depending on its location. It is caused by the erosion of a circumscribed area of mucous membrane. Peptic ulcers are more likely to be in the duodenum than in the stomach. They tend to occur singly, but there may be several present at one time. Chronic ulcers usually occur in the lesser curvature of the stomach, near the pylorus. Peptic ulcer has been associated with bacterial infection, such as *Helicobacter pylori*. The greatest frequency is noted in people between the ages of 40 and 60 years. After menopause, the incidence among women is almost equal to that in men. Predisposing factors include family history of peptic ulcer, blood type O, chronic use of nonsteroidal anti-inflammatory drugs (NSAIDs), alcohol ingestion, excessive smoking, and, possibly, high stress. Esophageal ulcers result from the backward flow of hydrochloric acid from the stomach into the esophagus.

Zollinger–Ellison syndrome (gastrinoma) is suspected when a patient has several peptic ulcers or an ulcer that is resistant to standard medical therapy. This syndrome involves extreme gastric hyperacidity (hypersecretion of gastric juice), duodenal ulcer, and gastrinomas (islet cell tumors). About 90% of tumors are found in the gastric triangle. About one third of gastrinomas are malignant. Diarrhea and steatorrhea (unabsorbed fat in the stool) may be evident. These patients may have coexistent parathyroid adenomas or hyperplasia and exhibit signs of hypercalcemia. The most frequent complaint is epigastric pain. The presence of *H. pylori* is not a risk factor.

Stress ulcer (not to be confused with Cushing's or Curling's ulcers) is a term given to acute mucosal ulceration of the duodenal or gastric area that occurs after physiologically stressful

events, such as burns, shock, severe sepsis, and multiple organ trauma. Fiberoptic endoscopy within 24 hours of trauma or injury shows shallow erosions of the stomach wall; by 72 hours, multiple gastric erosions are observed, and as the stressful condition continues, the ulcers spread. When the patient recovers, the lesions are reversed; this pattern is typical of stress ulceration.

Clinical Manifestations

- Symptoms of an ulcer may last days, weeks, or months and may subside only to reappear without cause. Many patients have asymptomatic ulcers.
- Dull, gnawing pain and a burning sensation in the midepigastrium or in the back are characteristic.
- Pain is relieved by eating or taking alkali; once the stomach has emptied or the alkali wears off, the pain returns.
- Sharply localized tenderness is elicited by gentle pressure on the epigastrium or slightly right of the midline.
- Other symptoms include pyrosis (heartburn) and a burning sensation in the esophagus and stomach, which moves up to the mouth, occasionally with sour eructation (burping).
- Vomiting is rare in uncomplicated duodenal ulcer; it may or may not be preceded by nausea and usually follows a bout of severe pain and bloating; it is relieved by ejection of the acid gastric contents.
- Constipation or diarrhea may result from diet and medications.
- Bleeding (15% of patients with gastric ulcers) and tarry stools may occur; a small portion of patients who bleed from an acute ulcer have only very mild symptoms or none at all.

Assessment and Diagnostic Methods

- Physical examination (epigastric tenderness, abdominal distention).
- Endoscopy (preferred, but upper gastrointestinal [GI] barium study may be done).
- Diagnostic tests include analysis of stool specimens for occult blood, gastric secretory studies, and biopsy and histology with culture to detect *H. pylori* (serologic testing, stool antigen tests, or a breath test may also detect *H. pylori*).

Medical Management

The goals of treatment are to eradicate *H. pylori* and manage gastric acidity.

Pharmacologic Therapy

- Antibiotics combined with proton pump inhibitors and bismuth salts to suppress *H. pylori*.
- H_2-receptor antagonists (in high doses in patients with Zollinger–Ellison syndrome) to decrease stomach acid secretion; maintenance doses of H_2-receptor antagonists are usually recommended for 1 year. Proton pump inhibitors may also be prescribed.
- Cytoprotective agents (protect mucosal cells from acid or NSAIDs).
- Antacids in combination with cimetidine (Tagamet) or ranitidine (Zantac) for treatment of stress ulcer and for prophylactic use.

Lifestyle Changes

- Stress reduction and rest are priority interventions. The patient needs to identify situations that are stressful or exhausting (eg, rushed lifestyle and irregular schedules) and implement changes, such as establishing regular rest periods during the day in the acute phase of the disease. Biofeedback, hypnosis, behavior modification, massage, or acupuncture may also be useful.
- Smoking cessation is strongly encouraged because smoking raises duodenal acidity and significantly inhibits ulcer repair. Support groups may be helpful.
- Dietary modification may be helpful. Patients should eat whatever agrees with them; small, frequent meals are not necessary if antacids or histamine blockers are part of therapy. Oversecretion and hypermotility of the GI tract can be minimized by avoiding extremes of temperature and overstimulation by meat extracts. Alcohol and caffeinated beverages such as coffee (including decaffeinated coffee, which stimulates acid secretion) should be avoided. Diets rich in milk and cream should be avoided also because they are potent acid stimulators. The patient is encouraged to eat three regular meals a day.

Surgical Management

- With the advent of H_2-receptor antagonists, surgical intervention is less common.
- If recommended, surgery is usually for intractable ulcers (particularly with Zollinger–Ellison syndrome), life-threatening hemorrhage, perforation, or obstruction. Surgical procedures include vagotomy, vagotomy with pyloroplasty, or Billroth I or II.

NURSING PROCESS

The Patient with Peptic Ulcer

Assessment

- Assess pain and methods used to relieve it; take a thorough history, including a 72-hour food intake history.
- If patient has vomited, determine whether emesis is bright red or coffee ground in appearance. This helps identify source of the blood.
- Ask patient about usual food habits, alcohol, smoking, medication use (NSAIDs), and level of tension or nervousness.
- Ask how patient expresses anger (especially at work and with family), and determine whether patient is experiencing occupational stress or family problems.
- Obtain a family history of ulcer disease.
- Assess vital signs for indicators of anemia (tachycardia, hypotension).
- Assess for blood in the stools with an occult blood test.
- Palpate abdomen for localized tenderness.

Diagnosis

Nursing Diagnoses

- Acute pain related to the effect of gastric acid secretion on damaged tissue
- Anxiety related to coping with an acute disease
- Imbalanced nutrition related to changes in diet
- Deficient knowledge about preventing symptoms and managing the condition

Collaborative Problems/Potential Complications

- Hemorrhage: upper GI
- Perforation
- Penetration
- Pyloric obstruction (gastric outlet obstruction)

Planning and Goals

The major goals of the patient may include relief of pain, reduced anxiety, maintenance of nutritional requirements, knowledge about the management and prevention of ulcer recurrence, and absence of complications.

Nursing Interventions

Relieving Pain and Improving Nutrition

- Administer prescribed medications.
- Avoid aspirin, which is an anticoagulant, and foods and beverages that contain acid-enhancing caffeine (colas, tea, coffee, chocolate), along with decaffeinated coffee.
- Encourage patient to eat regularly spaced meals in a relaxed atmosphere; obtain regular weights and encourage dietary modifications.
- Encourage relaxation techniques.

Reducing Anxiety

- Assess what patient wants to know about the disease, and evaluate level of anxiety; encourage patient to express fears openly and without criticism.
- Explain diagnostic tests and administering medications on schedule.
- Interact in a relaxing manner, help in identifying stressors, and explain effective coping techniques and relaxation methods.
- Encourage family to participate in care, and give emotional support.

Monitoring and Managing Complications

If hemorrhage is a concern

- Assess for faintness or dizziness and nausea, before or with bleeding; test stool for occult or gross blood;

monitor vital signs frequently (tachycardia, hypotension, and tachypnea).
- Insert an indwelling urinary catheter and monitor intake and output; insert and maintain an IV line for infusing fluid and blood.
- Monitor laboratory values (hemoglobin and hematocrit).
- Insert and maintain a nasogastric tube and monitor drainage; provide lavage as ordered.
- Monitor oxygen saturation and administering oxygen therapy.
- Place the patient in the recumbent position with the legs elevated to prevent hypotension, or place the patient on the left side to prevent aspiration from vomiting.
- Treat hypovolemic shock as indicated (see "Nursing Management" under "Shock" for additional information).

If perforation and penetration are concerns
- Note and report symptoms of penetration (back and epigastric pain not relieved by medications that were effective in the past).
- Note and report symptoms of perforation (sudden abdominal pain, referred pain to shoulders, vomiting and collapse, extremely tender and rigid abdomen, hypotension and tachycardia, or other signs of shock).

See "Perioperative Nursing Management" for additional information.

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE
- Assist the patient in understanding the condition and factors that help or aggravate it.
- Teach patient about prescribed medications, including name, dosage, frequency, and possible side effects. Also identify medications such as aspirin that patient should avoid.
- Instruct patient about particular foods that will upset the gastric mucosa, such as coffee, tea, colas, and alcohol, which have acid-producing potential.
- Encourage patient to eat regular meals in a relaxed setting and to avoid overeating.

- Explain that smoking may interfere with ulcer healing; refer patient to programs to assist with smoking cessation.
- Alert patient to signs and symptoms of complications to be reported. These complications include hemorrhage (cool skin, confusion, increased heart rate, labored breathing, and blood in the stool), penetration and perforation (severe abdominal pain, rigid and tender abdomen, vomiting, elevated temperature, and increased heart rate), and pyloric obstruction (nausea, vomiting, distended abdomen, and abdominal pain). To identify obstruction, insert and monitor nasogastric tube; more than 400 mL residual suggests obstruction.

CONTINUING CARE

- Teach patient that follow-up supervision is necessary for about 1 year.
- Tell patient that the ulcer could recur; advise patient to seek medical assistance if symptoms recur.
- Inform patient and family that surgery is no guarantee of cure. Discuss possible postoperative sequelae, such as intolerance to dairy products and sweet foods.

Evaluation

Expected Patient Outcomes

- Remains free of pain between meals
- Experiences less anxiety
- Complies with therapeutic regimen
- Maintains weight
- Experiences no complications

For more information, see Chapter 37 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Pericarditis (Cardiac Tamponade)

Pericarditis refers to an inflammation of the pericardium, the membranous sac enveloping the heart. It may be primary or

may develop in the course of a variety of medical and surgical disorders. Some causes are unknown; others include infection (usually viral, rarely bacterial or fungal), connective tissue disorders, hypersensitivity states, diseases of adjacent structures, neoplastic disease, radiation therapy, trauma, renal disorders, and tuberculosis (TB).

Pericarditis may be subacute, acute, or chronic and may be classified by the layers of the pericardium becoming attached to each other (adhesive) or by what accumulates in the pericardial sac: serum (serous), pus (purulent), calcium deposits (calcific), clotting proteins (fibrinous), or blood (sanguinous). Frequent or prolonged episodes of pericarditis may lead to thickening and decreased elasticity that restrict the heart's ability to fill properly with blood (constrictive pericarditis). The pericardium may also become calcified, which restricts ventricular contraction. Pericarditis can lead to an accumulation of fluid in the pericardial sac (pericardial effusion) and increased pressure on the heart, leading to cardiac tamponade.

Clinical Manifestations of Pericarditis

- Characteristic symptom is pain. Pain, which is felt over the precordium or beneath the clavicle and in the neck and left scapular region, is aggravated by breathing, turning in bed, and twisting the body; it is relieved by sitting up (or leaning forward).
- The most characteristic sign of pericarditis is a creaky or scratchy friction rub heard most clearly at the left lower sternal border.
- Other signs may include mild fever, increased WBC count, anemia, an elevated erythrocyte sedimentation rate (ESR) or C-reactive protein level, nonproductive cough, or hiccough.
- Dyspnea and other signs and symptoms of heart failure (HF) may occur.

Clinical Manifestations of Cardiac Tamponade

- Falling blood pressure, rising venous pressure (distended neck veins), and distant (muffled) heart sounds with pulsus paradoxus

- Shortness of breath, chest tightness, or dizziness
- Anxious, confused, and restless state
- Dyspnea, tachypnea, and precordial pain
- Elevated central venous pressure (CVP)

Assessment and Diagnostic Methods

Diagnosis is based on history, signs, and symptoms; echocardiogram; and electrocardiogram (ECG). CT and MRI are useful diagnostic tools as well. Occasionally, a video-assisted pericardioscope-guided biopsy of the pericardium or epicardium is performed.

Medical Management

Objectives of management are to determine the cause, to administer therapy for the specific cause (when known), and to detect signs and symptoms of cardiac tamponade.

Bed rest is instituted when cardiac output is impaired until fever, chest pain, and friction rub have disappeared.

Pharmacologic Therapy: Pericarditis

- Analgesics and NSAIDs such as aspirin or ibuprofen (Motrin) to relieve pain and hasten reabsorption of fluid in rheumatic pericarditis. Colchicine may also be used as an alternative medication.
- Corticosteroids (eg, prednisone) may be prescribed if the pericarditis is severe or if the patient does not respond to NSAIDs.

Surgical Management: Cardiac Tamponade

- Thoracotomy for penetrating cardiac injuries
- Pericardiocentesis for pericardial fluid removal
- Surgical removal of the tough encasing pericardium (pericardiectomy) if indicated

P

NURSING ALERT

Nursing assessment skills are key to anticipating and identifying the triad of symptoms of cardiac tamponade: falling arterial pressure, rising venous pressure, and distant heart sounds. Search diligently for a pericardial friction rub.

NURSING PROCESS

The Patient with Pericarditis

Assessment

- Assess pain by observation and evaluation while having patient vary positions to determine precipitating or intensifying factors. (Is pain influenced by respiratory movements?)
- Assess pericardial friction rub (a pericardial friction rub is continuous, distinguishing it from a pleural friction rub). Ask patient to hold breath to help in differentiation: audible on auscultation, synchronous with heartbeat, best heard at the left sternal edge in the fourth intercostal space where the pericardium comes into contact with the left chest wall, scratchy or leathery sound, louder at the end of expiration and may be best heard with patient in sitting position.
- Monitor temperature frequently, because pericarditis causes an abrupt onset of fever in a previously afebrile patient.

Diagnosis

Nursing Diagnoses

- Acute pain related to inflammation of the pericardium

Collaborative Problems/Potential Complications

- Pericardial effusion
- Cardiac tamponade

Planning and Goals

The major goals of the patient may include relief of pain and absence of complications.

Nursing Interventions

Relieving Pain

- Advise bed rest or chair rest in a sitting-upright and leaning-forward position.
- Instruct patient to resume activities of daily living as chest pain and friction rub abate.
- Administer medications; monitor and record responses.
- Instruct patient to resume bed rest if chest pain and friction rub recur.

Monitoring and Managing Potential Complications

- Observe for pericardial effusion, which can lead to cardiac tamponade: arterial pressure falls; systolic pressure falls while diastolic pressure remains stable; pulse pressure narrows; heart sounds progress from being distant to imperceptible.
- Observe for neck vein distention and other signs of rising CVP.
- Notify physician immediately upon observing any of the above symptoms, and prepare for diagnostic echocardiography and pericardiocentesis. Reassure patient and continue to assess and record signs and symptoms until physician arrives.

Evaluation

Expected Patient Outcomes

- Is free of pain
- Experiences no complications

For more information, see Chapters 29 and 30 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Perioperative Nursing Management

Preoperative Concerns

Surgery, whether elective or emergency, is a stressful, complex event. Surgery may be performed for a variety of reasons. It may be diagnostic (eg, biopsy specimen, exploratory laparotomy). It may be curative (eg, excision of tumor mass). It may be reparative (eg, repair of wounds). It may be reconstructive or cosmetic (eg, a facelift). It may be palliative (eg, pain relief). Surgery may also be classified according to the degree of urgency involved (emergency, urgent, required, elective, and optional).

Whatever its classification, current surgery involves many more ambulatory procedures than ever before and administrative processes that are new to nursing and other health care staff. However, perioperative nursing concerns still focus on the patient and his or her well-being. Inpatient or outpatient, all surgical procedures require a comprehensive preoperative nursing assessment and interventions to prepare the patient and family before surgery.

Nursing Management

Informed Consent

- Reinforce information provided by surgeon.
- Notify physician if patient needs additional information to make his or her decision.
- Ascertain that the consent form has been signed before administering psychoactive premedication. Informed consent is required for invasive procedures, such as incision, biopsy, cystoscopy, or paracentesis; procedures requiring sedation and/or anesthesia; nonsurgical procedures that pose more than slight risk to the patient (arteriography); and procedures involving radiation.
- Arrange for a responsible family member or legal guardian to be available to give consent when the patient is a minor or is unconscious or incompetent (an emancipated minor [married or independently earning own living] may sign his or her own surgical consent form).
- Place the signed consent form in a prominent place on the patient's chart.

Assessment: Inpatient Surgery

- Obtain a health history and perform a physical examination to establish vital signs and a database for future comparisons.
- Determine the existence of allergies, previous allergic reactions, any sensitivities to medications, and past adverse reactions to these agents; report a history of bronchial asthma to the anesthesiologist.
- During the physical examination, note significant physical findings such as physical abuse, pressure ulcers, edema, or abnormal breath sounds that further describe the patient's overall condition.
- Obtain and document medication history; include dosage and frequency of prescribed and over-the-counter (OTC) preparations, particularly adrenal corticosteroids, diuretics, phenothiazines, antidepressants, tranquilizers, insulin, and antibiotics.
- Assess patient's usual level of functioning and typical daily activities to assist in patient's care and recovery or rehabilitation plans.
- Determine nutritional needs on the basis of patient's height and weight, body mass index (BMI), triceps skinfold

thickness, upper arm circumference, serum protein levels, or nitrogen balance. Nutrition deficiencies should be corrected before surgery.

- Assess mouth for dental caries, dentures, and partial plates. Decayed teeth or dental prostheses may become dislodged during intubation for anesthetic delivery and occlude the airway.
- Assess cardiovascular status to meet oxygen and circulatory demands.
- Determine the value and reliability of patient's support systems; determine role of patient's family or friends.
- Elicit patient concerns that can have a bearing on the surgical experience.
- Identify the ethnic group to which the patient relates and the customs and beliefs the patient holds about illness and health care providers.
- Monitor patients who are obese for abdominal distention; phlebitis; and cardiovascular, endocrine, hepatic, and biliary diseases, which occur more readily in the obese.
- Be alert for a history of drug or alcohol abuse when obtaining the patient's history; remain patient, ask frank questions, and maintain a nonjudgmental attitude.
- Investigate the mildest symptoms or slightest temperature elevation in patients with disorders affecting the immune system (eg, acquired immunodeficiency syndrome [AIDS], leukemia); use strict asepsis.

Assessment: Ambulatory Surgery

- Obtain the health history of the ambulatory or same-day surgical patient by telephone interview or at preadmission testing. Ask about recent and past health history, allergies, medications, preoperative preparation, and psychosocial and demographic factors.
- Complete the physical assessment the day of surgery.

Gerontologic Considerations

Monitor the older person undergoing surgery for subtle clues that indicate underlying problems because elderly patients have less physiologic reserve (cardiac, renal, and hepatic function and GI activity) than younger patients. Also monitor

elderly patients for dehydration, hypovolemia, and electrolyte imbalances, which can be a significant problem in the elderly population.

Nursing Diagnoses

- Anxiety related to the surgical experience (anesthesia, pain) and the outcome of surgery
- Risk for ineffective therapeutic management regimen related to deficient knowledge of preoperative procedures and protocols and postoperative expectations
- Fear related to perceived threat of the surgical procedure and separation from support system
- Deficient knowledge related to the surgical process

Planning and Goals

The surgical patient's major goals may include relief of preoperative anxiety, adequate nutrition and fluids, optimal respiratory and cardiovascular status, optimal hepatic and renal function, mobility and active body movement, spiritual comfort, and knowledge of preoperative preparations and postoperative expectations.

Nursing Interventions

Reducing Anxiety and Fear: Providing Psychosocial Support

- Be a good listener, be empathetic, and provide information that helps alleviate concerns.
- During preliminary contacts, give the patient opportunities to ask questions and to become acquainted with those who might be providing care during and after surgery.
- Acknowledge patient concerns or worries about impending surgery by listening and communicating therapeutically.
- Explore any fears with patient, and arrange for the assistance of other health professionals if required.
- Teach patient cognitive strategies that may be useful for relieving tension, overcoming anxiety, and achieving relaxation, including imagery, distraction, or optimistic affirmations.

Managing Nutrition and Fluids

- Provide nutritional support as ordered to correct any nutrient deficiency before surgery to provide enough protein for tissue repair.

- Instruct patient that oral intake of food or water should be withheld 8 to 10 hours before the operation (most common), unless physician allows clear fluids up to 3 to 4 hours before surgery.
- Inform patient that a light meal may be permitted on the preceding evening when surgery is scheduled in the morning, or provide a soft breakfast, if prescribed, when surgery is scheduled to take place after noon and does not involve any part of the GI tract.
- In dehydrated patients, and especially in older patients, encourage fluids by mouth, as ordered, before surgery, and administer fluids intravenously as ordered.
- Monitor the patient with a history of chronic alcoholism for malnutrition and other systemic problems that increase the surgical risk as well as for alcohol withdrawal (delirium tremens up to 72 hours after alcohol withdrawal).

Promoting Optimal Respiratory and Cardiovascular Status

- Urge patient to stop smoking 2 months before surgery (or at least 24 hours before).
- Teach patient breathing exercises and how to use an incentive spirometer if indicated.
- Assess patient with underlying respiratory disease (eg, asthma, chronic obstructive pulmonary disease [COPD]) carefully for current threats to pulmonary status; assess patient's use of medications that may affect postoperative recovery.
- In the patient with cardiovascular disease, avoid sudden changes of position, prolonged immobilization, hypotension or hypoxia, and overloading of the circulatory system with fluids or blood.

Supporting Hepatic and Renal Function

- If patient has a disorder of the liver, carefully assess various liver function tests and acid–base status.
- Frequently monitor blood glucose levels of the patient with diabetes before, during, and after surgery.
- Report the use of steroid medications for any purpose by the patient during the preceding year to the anesthesiologist and surgeon.

- Monitor patient for signs of adrenal insufficiency.
- Assess patients with uncontrolled thyroid disorders for a history of thyrotoxicosis (with hyperthyroid disorders) or respiratory failure (with hypothyroid disorders).

Promoting Mobility and Active Body Movement

- Explain the rationale for frequent position changes after surgery (to improve circulation, prevent venous stasis, and promote optimal respiratory function) and show patient how to turn from side to side and assume the lateral position without causing pain or disrupting IV lines, drainage tubes, or other apparatus.
- Discuss any special position patient will need to maintain after surgery (eg, adduction or elevation of an extremity) and the importance of maintaining as much mobility as possible despite restrictions.
- Instruct patient in exercises of the extremities, including extension and flexion of the knee and hip joints (similar to bicycle riding while lying on the side); foot rotation (tracing the largest possible circle with the great toe); and range of motion of the elbow and shoulder.
- Use proper body mechanics, and instruct patient to do the same. Maintain patient's body in proper alignment when patient is placed in any position.

Respecting Spiritual and Cultural Beliefs

- Help patient obtain spiritual help if he or she requests it; respect and support the beliefs of each patient.
- Ask if the patient's spiritual adviser knows about the impending surgery.
- When assessing pain, remember that some cultural groups are unaccustomed to expressing feelings openly. Individuals from some cultural groups may not make direct eye contact with others; this lack of eye contact is not avoidance or a lack of interest but a sign of respect.
- Listen carefully to patient, especially when obtaining the history. Correct use of communication and interviewing skills can help the nurse acquire invaluable information and insight. Remain unhurried, understanding, and caring.

Providing Preoperative Patient Education

- Teach each patient as an individual, with consideration for any unique concerns or learning needs.
- Begin teaching as soon as possible, starting in the physician's office and continuing during the preadmission visit, when diagnostic tests are being performed, through arrival in the operating room.
- Space instruction over a period of time to allow patient to assimilate information and ask questions.
- Combine teaching sessions with various preparation procedures to allow for an easy flow of information. Include descriptions of the procedures and explanations of the sensations the patient will experience.
- During the preadmission visit, arrange for the patient to meet and ask questions of the perianesthesia nurse, view audiovisuals, and review written materials. Provide a telephone number for patient to call if questions arise closer to the date of surgery.
- Reinforce information about the possible need for a ventilator and the presence of drainage tubes or other types of equipment to help the patient adjust during the postoperative period.
- Inform the patient when family and friends will be able to visit after surgery and that a spiritual advisor will be available if desired.

Teaching the Ambulatory Surgical Patient

- For the same-day or ambulatory surgical patient, teach about discharge and follow-up home care. Education can be provided by a videotape, over the telephone, or during a group meeting, night classes, preadmission testing, or the preoperative interview.
- Answer questions and describe what to expect.
- Tell the patient when and where to report, what to bring (insurance card, list of medications and allergies), what to leave at home (jewelry, watch, medications, contact lenses), and what to wear (loose-fitting, comfortable clothes; flat shoes).
- During the last preoperative phone call, remind the patient not to eat or drink as directed; brushing teeth is permitted, but no fluids should be swallowed.

Teaching Deep-Breathing and Coughing Exercises

- Teach the patient how to promote optimal lung expansion and consequent blood oxygenation after anesthesia by assuming a sitting position, taking deep and slow breaths (maximal sustained inspiration), and exhaling slowly.
- Demonstrate how patient can splint the incision line to minimize pressure and control pain (if there will be a thoracic or abdominal incision).
- Inform patient that medications are available to relieve pain and that they should be taken regularly for pain relief to enable effective deep-breathing and coughing exercises.

Explaining Pain Management

- Instruct patient to take medications as frequently as prescribed during the initial postoperative period for pain relief.
- Discuss the use of oral analgesic agents with patient before surgery, and assess patient's interest and willingness to participate in pain relief methods.
- Instruct patient in the use of a pain rating scale to promote postoperative pain management.

Preparing the Bowel for Surgery

- If ordered preoperatively, administer or instruct the patient to take the antibiotic and a cleansing enema or laxative the evening before surgery and repeat it the morning of surgery.
- Have the patient use the toilet or bedside commode rather than the bedpan for evacuation of the enema, unless the patient's condition presents some contraindication.

Preparing Patient for Surgery

- Instruct patient to use detergent–germicide for several days at home (if the surgery is not an emergency).
- If hair is to be removed, remove it immediately before the operation using electric clippers.
- Dress patient in a hospital gown that is left untied and open in the back.
- Cover patient's hair completely with a disposable paper cap; if patient has long hair, it may be braided; hairpins are removed.
- Inspect patient's mouth and remove dentures or plates.

- Remove jewelry, including wedding rings (if patient objects, securely fasten the ring with tape).
- Give all articles of value, including dentures and prosthetic devices, to family members, or if needed label articles clearly with patient's name and store in a safe place according to agency policy.
- Assist patients (except those with urologic disorders) to void immediately before going to the operating room.
- Administer preanesthetic medication as ordered, and keep the patient in bed with the side rails raised. Observe patient for any untoward reaction to the medications. Keep the immediate surroundings quiet to promote relaxation.

Transporting Patient to Operating Room

- Send the completed chart with patient to operating room; attach surgical consent form and all laboratory reports and nurses' records, noting any unusual last-minute observations that may have a bearing on the anesthesia or surgery at the front of the chart in a prominent place.
- Take the patient to the preoperative holding area, and keep the area quiet, avoiding unpleasant sounds or conversation.

NURSING ALERT

Someone should be with the preoperative patient at all times to ensure safety and provide reassurance (verbally as well as nonverbally by facial expression, manner, or the warm grasp of a hand).

Attending to Special Needs of Older Patients

- Assess the older patient for dehydration, constipation, and malnutrition; report if present.
- Maintain a safe environment for the older patient with sensory limitations such as impaired vision or hearing and reduced tactile sensitivity.
- Initiate protective measures for the older patient with arthritis, which may affect mobility and comfort. Use adequate padding for tender areas. Move patient slowly and protect bony prominences from prolonged pressure. Provide gentle massage to promote circulation.

- Take added precautions when moving an elderly patient because decreased perspiration leads to dry, itchy, fragile skin that is easily abraded.
- Apply a lightweight cotton blanket as a cover when the elderly patient is moved to and from the operating room, because decreased subcutaneous fat makes older people more susceptible to temperature changes.
- Provide the elderly patient with an opportunity to express fears; this enables patient to gain some peace of mind and a sense of being understood.

Attending to the Family's Needs

- Assist the family to the surgical waiting room, where the surgeon may meet the family after surgery.
- Reassure the family they should not judge the seriousness of an operation by the length of time the patient is in the operating room.
- Inform those waiting to see the patient after surgery that the patient may have certain equipment or devices in place (ie, IV lines, indwelling urinary catheter, nasogastric tube, suction bottles, oxygen lines, monitoring equipment, and blood transfusion lines).
- When the patient returns to the room, provide explanations regarding the frequent postoperative observations.

Evaluation

Expected Patient Outcomes

- Reports decreased fear and anxiety
- Voices understanding of surgical intervention

Postoperative Nursing Management

The postoperative period extends from the time the patient leaves the operating room until the last follow-up visit with the surgeon (as short as a day or two or as long as several months). During the postoperative period, nursing care is directed at reestablishing the patient's physiologic equilibrium, alleviating pain, preventing complications, and teaching the patient self-care. Careful assessment and immediate intervention assist the patient in returning to optimal function quickly, safely, and as comfortably as possible. Ongoing care in the community through home care, telephone

follow-up, and clinic or office visits promotes an uncomplicated recovery.

Postanesthesia care in some hospitals and ambulatory surgical centers is divided into three phases. Phase I, the immediate recovery phase, requires intensive nursing care. In phase II, the patient is prepared for self-care or care in the hospital or an extended care setting. In phase III, the patient is prepared for discharge.

Nursing Management in the Postanesthesia Care Unit

Patients still under anesthesia or recovering from it are placed in the postanesthesia care unit (PACU), formerly called the postanesthesia recovery room, which is located adjacent to the operating rooms. Patients may be in the PACU for as long as 4 to 6 hours or for as little as 1 to 2 hours. In some cases, the patient is discharged to home directly from this unit. Documentation of information and events germane to PACU care includes the following:

- Medical diagnosis and type of surgery performed
- Patient's age and general condition, airway patency, vital signs
- Anesthetic and other medications used (eg, opioids and other analgesics, muscle relaxant, antibiotics)
- Any problems that occurred in the operating room that might influence postoperative care (eg, extensive hemorrhage, shock, cardiac arrest)
- Fluid administered, estimated blood loss and replacement
- Any tubing, drains, catheters, or other supportive aids
- Specific information about which the surgeon, anesthesiologist, or anesthetist wishes to be notified
- Pathology encountered (if malignancy, whether the patient or family has been informed)

The nursing management objectives for the patient in the PACU are to provide care until the patient has recovered from the effects of anesthesia (ie, until return of motor and sensory functions), is oriented, has stable vital signs, and shows no evidence of hemorrhage.

Role of PACU Nurse

The PACU nurse obtains frequent assessments of the patient's oxygen saturation, pulse volume and regularity, depth and

nature of respirations, skin color, level of consciousness, and ability to respond to commands. In some cases, end-tidal carbon dioxide ($ETCO_2$) levels are monitored as well. The nurse also performs a baseline assessment followed by checking the surgical site for drainage or hemorrhage and connecting all drainage tubes and monitoring lines. After the initial assessment, the nurse monitors vital signs and assesses the patient's general physical status at least every 15 minutes, including assessment of cardiovascular function with the above assessments. The nurse maintains airway patency and supplemental oxygen; maintains cardiovascular stability with prevention, prompt recognition, and treatment of hemorrhage, hypertension, dysrhythmias, hypotension and shock; relieves pain and anxiety; and controls nausea and vomiting. The nurse also notes any pertinent information from the patient's history that may be significant (eg, hard of hearing, blind, history of seizures, diabetes, allergies to certain medications or other substances).

Usually the following measures are used to determine the patient's readiness for discharge from the PACU:

- Uncompromised pulmonary function
- Pulse oximetry readings of adequate oxygen saturation
- Stable vital signs
- Orientation to place, events, and time
- Urine output not less than 30 mL/h
- Nausea and vomiting under control
- Minimal pain

Patients being discharged directly to home are given teaching, written instructions, and information about follow-up care. Usually, the nurse makes sure they are transported home safely by a responsible person.

Nursing Management in Same-Day Surgery

- Inform the patient and caregiver (ie, family member or friend) about expected outcomes and immediate postoperative changes anticipated in the patient's capacity for self-care.
- Provide written instructions about wound care, activity and dietary recommendations, medication, and follow-up visits to the same-day surgery unit or the surgeon. Provide caregiver

with verbal and written instructions about what to observe the patient for and about the actions to take if complications occur.

- Give prescriptions to patient, provide the nurse's or surgeon's telephone number, and encourage patient and caregiver to call if questions arise. Follow-up telephone calls from the nurse or surgeon may be used to assess patient's progress and to answer any questions.
- Instruct patient to limit activity for 24 to 48 hours (avoid driving a vehicle, drinking alcoholic beverages, or performing tasks that require energy or skill); to consume fluids as desired; and to consume smaller than normal amounts of food.
- Caution patient not to make important decisions at this time because the medications, anesthesia, and surgery may affect thinking ability.
- Refer patient for home care as indicated (elderly or frail patients, those who live alone, and patients with other health care problems that may interfere with self-care or resumption of usual activities).

Postoperative Nursing Management in Home Care

- The home care nurse assesses the patient's physical status (eg, respiratory and cardiovascular status, adequacy of pain management, surgical incision) and the patient's and family's ability to adhere to the recommendations given at the time of discharge. Previous teaching is reinforced as needed.
- The home care nurse may change surgical dressings or catheters or teach the patient or family how to do so, monitor the patency of a drainage system, administer medications or teach the patient and family to do so, and assess for surgical complications.
- The home care nurse determines if any additional services are needed and assists the patient and family to arrange for them (needed supplies, resources or support groups the patient may want to contact).
- The home care nurse reinforces previous teaching and reminds the patient to keep follow-up appointments. The

patient and family are instructed about signs and symptoms to report to the surgeon.

Postoperative Nursing Management in the Clinical Unit

- Prepare the patient's unit by assembling the necessary equipment and supplies: IV pole, drainage receptacle holder, emesis basin, tissues, disposable pads (Chux), blankets, and postoperative charting forms.
- Receive report from the PACU nurse containing baseline data, including demographic data, medical diagnosis, procedure performed, comorbid conditions, unexpected intraoperative events, estimated blood loss, type and amount of fluids received, medications administered for pain, whether patient has voided, information patient and family have received about patient's condition, and specific information about which the surgeon, anesthesiologist, or anesthetist wishes to be notified.
- Review the postoperative orders, admit patient to unit, perform an initial assessment, and attend to patient's immediate needs.
- During the first hours after surgery, interventions focus on helping the patient recover from the effects of anesthesia, performing frequent assessments, monitoring for complications, managing pain, and implementing measures to promote self-care, successful management of the therapeutic regimen, discharge to home, and full recovery.
- In the initial hours after admission to the clinical unit, adequate ventilation, hemodynamic stability, incisional pain, surgical site integrity, nausea and vomiting, neurologic status, and spontaneous voiding are primary concerns.

NURSING ALERT

Unless indicated more frequently, record the pulse, blood pressure, and respirations every 15 minutes for the first hour and every 30 minutes for the next 2 hours. Thereafter, they are measured less frequently if they remain stable. Monitor patient's temperature every 4 hours for the first 24 hours.

Nursing Interventions

Maintaining Patent Airway

- Check the orders for and apply supplemental oxygen. Assess respiratory rate and depth, ease of respirations, oxygen saturation, and breath sounds.
- Monitor patient for airway obstruction in which the tongue falls backward and patient has choking, noisy, and irregular respirations and, within minutes, a blue, dusky color (cyanosis) of the skin. Maintain hard rubber or plastic airway in patient's mouth or nose until gag reflex resumes.
- Encourage patient to turn frequently and take deep breaths and cough at least every 2 hours.
- Carefully assist patient to splint an abdominal or thoracic incision site to help patient overcome the fear that the exertion of coughing might open the incision.
- Administer pain medications to permit more effective coughing; suction patient as needed.
- Assist and encourage patient to use incentive spirometer hourly while awake (10 breaths per hour).

NURSING ALERT

Coughing is contraindicated in patients who have head injuries or who have undergone intracranial surgery, eye surgery, or plastic surgery.

Maintaining Cardiovascular Stability

- Monitor cardiovascular stability by assessing patient's mental status; vital signs; cardiac rhythm; skin temperature, color, and moisture; and urine output.
- Assess patency of all IV lines.
- On patient's arrival in the clinical unit, observe the surgical site for bleeding, type and integrity of dressing, and drains (eg, Penrose, Hemovac, and Jackson-Pratt).
- Assess output from wound drainage systems and amount of bloody drainage on the surgical dressing frequently. Mark and time spots of drainage on dressings; report excess drainage or fresh blood to surgeon immediately.

- Reinforce dressing with sterile gauze bandages and record the time. Do not change initial dressing; surgeon will usually wish to be present.

NURSING ALERT

A systolic blood pressure of less than 90 mm Hg is usually considered reportable at once. However, the patient's preoperative or baseline blood pressure is used to make informed postoperative comparisons. A previously stable blood pressure that shows a downward trend of 5 mm Hg at each 15-minute reading should also be reported.

Assessing and Managing Pain

- Assess pain level using a verbal or visual analog scale, and assess the characteristics of the pain.
- Discuss options in pain relief measures with patient to determine the best medication. Assess effectiveness of medication periodically beginning 30 minutes after administration (sooner if given intravenously).
- Administer medication at prescribed intervals, or if ordered as needed, before pain becomes severe or unbearable. Risk of addiction is negligible with use of opioids for short-term pain control.
- Provide other pain relief measures (changing patient's position, using distraction, applying cool washcloths to the face, and rubbing the back with a soothing lotion) to relieve general discomfort temporarily.

Maintaining Normal Body Temperature

- Monitor body system function and vital signs with temperature every 4 hours for the first 24 hours and every shift thereafter.
- Report signs of hypothermia to physician. This is a particular risk in elderly patients and those with long surgeries.
- Maintain the room at a comfortable temperature, and provide blankets to prevent chilling.
- Monitor patient for cardiac dysrhythmias.

- Take efforts to identify malignant hyperthermia and to treat it early.

Assessing Mental Status

- Assess mental status (level of consciousness, speech, and orientation) and compare to preoperative baseline; change may be related to anxiety, pain, medications, oxygen deficit, or hemorrhage.
- Assess for possible causes of discomfort, such as tight, drainage-soaked bandages or distended bladder.
- Address sources of discomfort, and report signs of complications to surgeon for immediate treatment.
- Assess neurovascular status (have patient move the hand or foot distal to the surgical site through a full range of motion, ensuring that all surfaces have intact sensation and assessing peripheral pulses).

Assessing and Managing GI Function and Promoting Nutrition

- If in place, maintain nasogastric tube and monitor patency and drainage.
- Provide symptomatic therapy, including antiemetic medications for nausea and vomiting.
- Administer phenothiazine medications as prescribed for severe, persistent hiccups.
- Assist patient to return to normal dietary intake gradually at a pace set by patient (liquids first, then soft foods, such as gelatin, junket, custard, milk, and creamed soups, are added gradually, then solid food).
- Remember that paralytic ileus and intestinal obstruction are potential postoperative complications that occur more frequently in patients undergoing intestinal or abdominal surgery. See specific GI disorders for discussion of treatment.
- Arrange for patient to consult with the dietitian to plan appealing, high-protein meals that provide sufficient fiber, calories, and vitamins. Nutritional supplements, such as Ensure or Sustacal, may be recommended.
- Instruct patient to take multivitamins, iron, and vitamin C supplements postoperatively if prescribed.

NURSING ALERT

At the slightest indication of nausea, turn patient completely on one side to promote mouth drainage and prevent aspiration of vomitus, which can cause asphyxiation and death.

Assessing and Managing Voluntary Voiding

- Assess for bladder distention and urge to void on patient's arrival in the unit and frequently thereafter (patient should void within 8 hours of surgery).
- Obtain order for catheterization before the end of the 8-hour time limit if patient has an urge to void and cannot, or if the bladder is distended and no urge is felt or patient cannot void.
- Initiate methods to encourage the patient to void (eg, letting water run, applying heat to perineum).
- Warm the bedpan to reduce discomfort and automatic tightening of muscles and urethral sphincter.
- Assist patient who complains of not being able to use the bedpan to use a commode or stand or sit to void (males), unless contraindicated.
- Take safeguards to prevent the patient from falling or fainting due to loss of coordination from medications or orthostatic hypotension.
- Note the amount of urine voided (report less than 30 mL/h) and palpate the suprapubic area for distention or tenderness, or use a portable ultrasound device to assess residual volume.
- Continue intermittent catheterization every 4 to 6 hours until patient can void spontaneously and postvoid residual is less than 100 mL.

Encouraging Activity

- Encourage most surgical patients to ambulate as soon as possible.
- Remind patient of the importance of early mobility in preventing complications (helps overcome fears).
- Anticipate and avoid orthostatic hypotension (postural hypotension: 20-mm Hg fall in systolic blood pressure or 10-mm Hg fall in diastolic blood pressure, weakness, dizziness, and fainting).

- Assess patient's feelings of dizziness and his or her blood pressure first in the supine position, after patient sits up, again after patient stands, and 2 to 3 minutes later.
- Assist patient to change position gradually. If patient becomes dizzy, return to supine position and delay getting out of bed for several hours.
- When patient gets out of bed, remain at patient's side to give physical support and encouragement.
- Take care not to tire patient.
- Initiate and encourage patient to perform bed exercises to improve circulation (range of motion to arms, hands and fingers, feet, and legs; leg flexion and leg lifting; abdominal and gluteal contraction).
- Encourage frequent position changes early in the postoperative period to stimulate circulation. Avoid positions that compromise venous return (raising the knee gatch or placing a pillow under the knees, sitting for long periods, and dangling the legs with pressure at the back of the knees).
- Apply antiembolism stockings, and assist patient in early ambulation. Check postoperative activity orders before getting patient out of bed. Then have patient sit on the edge of bed for a few minutes initially; advance to ambulation as tolerated.

Promoting Fluid Balance

- Monitor patient closely to detect and correct conditions such as fluid volume deficit, altered tissue perfusion, and decreased cardiac output.
- Assess patency of IV lines, ensuring that appropriate fluids are administered at prescribed rate (up to 24 hours or until patient is tolerating oral fluids).
- Record intake and output, including emesis and output from wound drainage systems, separately and add them to determine fluid balance (with indwelling urinary catheter, monitor outputs hourly and report rates of less than 30 mL/h; if the patient is voiding, report an output of less than 240 mL per shift).
- Monitor electrolyte levels and hemoglobin and hematocrit levels.

Promoting Self-Care

- Have patient perform as much routine hygiene care as possible on first postoperative day (setting up patient to bathe with a bedside wash basin, or, if possible, assisting patient to bathroom to sit at a chair at the sink).
- Assist patient to build up to ambulating a functional distance (length of house or apartment), get in and out of bed unassisted, and be independent with toileting, to prepare for discharge to home.
- Ask patient to perform as much as possible and then to call for assistance. Collaborate with patient for progressive activity, and assess vital signs before, during, and after a scheduled activity.
- Provide physical support to maintain patient's safety, and provide a positive attitude about patient's ability to perform the activity, promoting confidence.
- While changing the dressing, teach patient how to care for incision and change dressings at home. Observe for indicators that patient is ready to learn, such as looking at the incision, expressing interest, or assisting in the dressing change.

Maintaining a Safe Environment

- Keep side rails up and bed in the low position.
- Assess level of consciousness and orientation.
- Determine whether patient needs his or her eyeglasses or hearing aid and provide them as soon as possible.
- Place all objects patient may need within reach, including, of course, the call bell.
- Implement any immediate postoperative orders concerning special positioning, equipment, or intervention.
- Ask patient to seek assistance with any activity.
- Use restraints only if needed (disoriented patient), and assess neurovascular status frequently.

Providing Emotional Support to Patient and Family

- Help patient and family work through their anxieties by providing reassurance and information and by spending time listening to and addressing their concerns.
- Describe hospital routines and what to expect in the hours and days until discharge.

- Explain the purpose of nursing assessments and interventions.
- Inform patients when they can take fluids or eat, when they will be getting out of bed, when tubes and drains will be removed, and so forth, to help them gain a sense of control and participation in recovery.
- Acknowledge family's concerns, and accept and encourage their participation in patient's care.
- Manipulate the environment to enhance rest and relaxation: provide privacy, reduce noise, adjust lighting, provide enough seating for family members, and perform any other supportive measures.

Monitoring and Preventing Postoperative Complications

Preventing Deep Vein Thrombosis

- Monitor for symptoms of deep vein thrombosis (DVT), which may include a pain or a cramp in the calf elicited on ankle dorsiflexion (Homans' sign); pain and tenderness may be followed by a painful swelling of the entire leg and may be accompanied by a slight fever and sometimes chills and perspiration.
- Administer prophylactic treatment for postoperative patients at risk (low-dose subcutaneous heparin, and then warfarin, external pneumatic compression, and thigh-high elastic pressure stockings).
- Avoid using blanket rolls, pillow rolls, or any form of elevation that can constrict vessels under the knees. Even prolonged "dangling" (having the patient sit on the edge of the bed with legs hanging over the side) can be dangerous and is not recommended in susceptible patients.
- Encourage adequate hydration (offer juices and water throughout the day).

Monitoring and Treating Hypotension and Shock

- Monitor closely for signs of shock (a fall in venous pressure, a rise in peripheral resistance, and tachycardia, or a fall in blood pressure). If the amount of blood loss exceeds 500 mL (especially if the loss is rapid), replacement is usually indicated.
- Monitor for the classic signs of shock: pallor; cool, moist skin; rapid breathing; cyanosis of the lips, gums, and tongue; a rapid, weak, thready pulse; decreasing pulse pressure; low blood pressure; and concentrated urine.

- Prevent hypovolemic shock by timely administration of IV fluids, blood, and medications that elevate blood pressure.
- Control pain by making patient as comfortable as possible and by using opioids judiciously. Avoid exposure, and maintain normothermia to prevent vasodilation.
- Administer volume replacement as ordered (lactated Ringer's solution or blood component therapy).
- Administer oxygen by nasal cannula, facemask, or mechanical ventilation.
- Administer cardiotonics, vasodilators, or steroids to improve cardiac function and reduce peripheral vascular resistance. Keep the patient warm; however, avoid overheating to prevent vessel dilation.
- Place patient flat in bed with legs elevated.
- Monitor respiratory and pulse rate, blood pressure, oxygen concentration, urinary output, level of consciousness, CVP, pulmonary artery pressure, pulmonary capillary wedge pressure, and cardiac output to provide information about respiratory and cardiovascular status.
- Monitor vital signs continuously until condition has stabilized.

Detecting and Minimizing Hemorrhage

- Note signs of extreme blood loss (apprehensiveness, restlessness, and thirst; cold, moist, pale skin; increased pulse rate; decreasing temperature; and rapid and deep respirations, often of the gasping type spoken of as "air hunger").
- If the hemorrhage progresses untreated, cardiac output decreases, arterial and venous blood pressure and hemoglobin level fall rapidly, the lips and the conjunctivae become pallid, spots appear before the eyes, a ringing is heard in the ears, and the patient grows weaker but remains conscious until near death.
- Administer blood or blood product transfusion, and determine the cause of hemorrhage.
- Inspect surgical site and incision for bleeding. If bleeding is evident, apply a sterile gauze pad and a pressure dressing, and elevate the site of the bleeding to the level of the heart, if possible; place patient in the shock position (lying flat on back with legs elevated at a 20-degree angle while

knees are kept straight). If indicated, prepare patient for return to surgery.

- Give special considerations to patients who decline blood transfusions, such as Jehovah's Witnesses, and to those who identify specific requests on their advance directives or living will.

NURSING ALERT

Giving too large a quantity of IV fluid or administering it too rapidly may raise the blood pressure enough to start the bleeding again.

Managing Wound Complications

- Hematoma: Monitor for bleeding beneath the skin at the surgical site, which may result in clot formation (hematoma) within the wound. (If clot is large, the wound may bulge, and healing is delayed unless the clot is removed.) Prepare patient for removal of several sutures by the physician, evacuation of the clot, and light wound packing with gauze. Healing occurs usually by granulation, or a secondary closure may be performed.
- Infection (wound sepsis): Monitor for (or instruct patient and family to monitor for) wound infection, which may not present until postoperative day 5. Risk factors for wound sepsis include wound contamination, foreign body, faulty suturing, devitalized tissue, hematoma, debilitation, dehydration, malnutrition, anemia, advanced age, extreme obesity, shock, length of preoperative hospitalization, duration of surgery, and associated disorders (eg, diabetes mellitus, immunosuppression). Signs and symptoms of infection include elevated pulse and temperature; increased WBC count; wound swelling, warmth, tenderness, or discharge; and incisional pain. Local signs may be absent if the infection is deep.
- If wound infection results from beta-hemolytic streptococci or *Clostridium* species, take care not to spread infection to others; provide intensive nursing care and care for open incision and drain if present. If needed, prepare patient for incision and drainage if the infection is deep.

Administer antimicrobial therapy, and initiate wound care regimen.

- Wound dehiscence and evisceration: Monitor for wound dehiscence (disruption of surgical incision or wound) and evisceration (protrusion of wound contents), which are serious complications, especially when they involve abdominal incisions or wounds. The earliest sign may be a gush of bloody (serosanguineous) peritoneal fluid from the wound; coils of intestine may push out of the abdomen, pain and vomiting may be noted, and frequently the patient will say that "something gave way." Monitor patients with risk factors particularly closely (patients with infection, marked distention, strenuous cough, increasing age, poor nutritional status, and the presence of pulmonary or cardiovascular disease in patients who undergo abdominal surgery). If wound disruption occurs, place patient in low Fowler's position and instruct him or her to lie quietly to minimize protrusion of body tissues. Cover the protruding tissue or coils of intestine with sterile dressings moistened with sterile saline, and notify the surgeon at once. Apply an abdominal binder as a prophylactic measure against an abdominal incision evisceration.

Promoting Home- and Community-Based Care

Although certain needs are germane to individual patients and the specific procedures they have undergone, patient education needs for postoperative care include the following:

- Provide detailed discharge instructions to assist patient in becoming proficient in self-care needs after surgery.
- Arrange for care by community-based services, such as a home care nurse, if necessary (older patients, patients who live alone, or patients without family support).
- Arrange for necessary services early in the acute care hospitalization.
- Wound care, drain management, catheter care, infusion therapy, and physical or occupational therapy are some of the needs addressed by community health care providers.
- Instruct patient to continue to perform bed exercises, wear pressure stockings when in bed, and rest as needed. Spray

silicone over the adhesive used to hold dressings in place; the silicone waterproofs the dressing so that the patient can bathe or swim, and it isolates the area from contamination.

Gerontologic Considerations

Elderly patients continue to be at increased risk for postoperative complications. Age-related physiologic changes in respiratory, cardiovascular, and renal function and the increased incidence of comorbid conditions demand skilled assessment to detect early signs of deterioration. Anesthetics and opioids can cause confusion in the older adult, and altered pharmacokinetics results in delayed excretion and prolonged respiratory depressive effects. Careful monitoring of electrolyte, hemoglobin, and hematocrit levels and urine output is essential because the older adult is less able to correct and compensate for fluid and electrolyte imbalances. Elderly patients may need frequent reminders and demonstrations to participate in care effectively.

- Maintain physical activity while patient is confused. Physical deterioration can worsen delirium and place patient at increased risk for other complications.
- Avoid restraints, because they can also worsen confusion. If possible, family or staff member is asked to sit with patient instead.
- Administer haloperidol (Haldol) or lorazepam (Ativan) as ordered during episodes of acute confusion; discontinue these medications as soon as possible to avoid side effects.
- Assist the older postoperative patient in early and progressive ambulation to prevent the development of problems such as pneumonia, altered bowel function, DVT, weakness, and functional decline; avoid sitting positions that promote venous stasis in the lower extremities.
- Provide assistance to keep patient from bumping into objects and falling. A physical therapy referral may be indicated to promote safe, regular exercise for the older adult.
- Provide easy access to call bell and commode; prompt voiding to prevent urinary incontinence.
- Provide extensive discharge planning to coordinate both professional and family care providers; the nurse, social worker, or nurse case manager may institute the plan for continuing care.

Evaluation

Expected Patient Outcomes

- Experiences decreased pain
- Maintains optimal respiratory function
- Does not develop DVT
- Exercises and ambulates as prescribed
- Wound heals without complication
- Resumes oral intake and normal bowel function
- Acquires knowledge and skills necessary to manage therapeutic regimen
- Experiences no complications and has normal vital signs

For more information, see Chapters 18 to 20 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Peripheral Arterial Occlusive Disease

Arterial insufficiency of the extremities is found more often in men and predominantly in the legs. The age of onset and the severity are influenced by the type and number of atherosclerotic risk factors present. Obstructive lesions are predominantly confined to segments of the arterial system extending from the aorta, below the renal arteries, to the popliteal artery.

Clinical Manifestations

Intermittent Claudication

- Claudication, the hallmark of peripheral arterial occlusive disease, is insidious and described as aching, cramping, fatigue, or weakness. Patient may report increased pain with ambulation.
- Rest pain is persistent, aching, or boring and is usually present in distal extremities with severe disease.
- Elevation or horizontal placement of the extremity aggravates the pain; lowering the extremity to a dependent position reduces pain.

Other Manifestations

- Coldness or numbness in the extremities accompanies intermittent claudication.

- Extremities may be cool and exhibit pallor on elevation or a ruddy, cyanotic color when in a dependent position.
- Skin and nail changes, ulcerations, gangrene, and muscle atrophy may be evident.
- Bruits may be auscultated and peripheral pulses may be diminished or absent.
- Inequality of pulses between extremities or absence of a normally palpable pulse is a sign of peripheral arterial disease (PAD).
- Nails may be thickened and opaque, and the skin shiny, atrophic, and dry, with sparse hair growth.

Assessment and Diagnostic Methods

The diagnosis of peripheral arterial occlusive disease may be made using continuous wave (CW). Doppler and ankle-brachial index (ABI) tests, treadmill testing for claudication, duplex ultrasonography, or other imaging studies previously described.

Medical Management

Key treatment measures include pharmacotherapy and surgery. Pentoxifylline (Trental) and cilostazol (Pletal) are approved for the treatment of symptomatic claudication. Antiplatelet agents such as aspirin or clopidogrel (Plavix) are used to prevent the formation of thromboemboli. Statin therapy can be used in some patients to reduce the incidence of new intermittent claudication symptoms. Surgery is reserved for treatment of severe and disabling claudication or when the limb is at risk for amputation because of tissue necrosis, and may include endarterectomy, bypass grafts, and vein grafts. Exercise programs combined with weight reduction and smoking cessation often improve activity limitations.

Nursing Management

Maintaining Circulation Postoperatively

The primary objective in postoperative management of patients who have had vascular procedures is to maintain adequate circulation through the arterial repair.

- Check pulses, Doppler assessment, color and temperature, capillary refill, and sensory and motor function of the

affected extremity and compare with those of the other extremity; record values initially every 15 minutes and then at progressively longer intervals.

- Perform Doppler evaluation of the vessels distal to the bypass graft for all postoperative vascular patients because it is more sensitive than palpation for pulses.
- Monitor ABI every 8 hours for the first 24 hours.
- Notify surgeon immediately if a peripheral pulse disappears; this may indicate thrombotic occlusion of the graft.

Monitoring and Managing Potential Complications

- Monitor urine output (more than 30 mL/h), CVP, mental status, and pulse rate and volume to permit early recognition and treatment of fluid imbalances.
- Instruct patient to avoid leg crossing and prolonged extremity dependence.
- Teach patient to perform leg elevation and to exercise limbs while in bed to reduce edema.
- Monitor for compartment syndrome (severe limb edema, pain, and decreased sensation).

Promoting Home- and Community-Based Care

- Assess patient's ability to manage independently or availability of family and friends to assist.
- Determine patient's motivation to make lifestyle changes needed with chronic disease.
- Assess patient's knowledge and ability to assess for postoperative complications, such as infection, occlusion of graft, and decreased blood flow.
- Determine if patient wants to stop smoking and encourage all efforts to do so.

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For more information, see Chapter 31 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Peritonitis

Peritonitis, inflammation of the peritoneum, is usually the result of bacterial infection, with the organisms coming from

disease of the GI tract, or, in women, the internal reproductive organs. It can also result from external sources, such as injury or trauma or an inflammation from an extraperitoneal organ, such as the kidney.

Pathophysiology

Peritonitis is caused by leakage of contents from abdominal organs into the abdominal cavity, usually as a result of inflammation, infection, ischemia, trauma, or tumor perforation. The most common bacteria implicated are *Escherichia coli*, and *Klebsiella*, *Proteus*, and *Pseudomonas* species. Other common causes are appendicitis, perforated ulcer, diverticulitis, and bowel perforation. Peritonitis may also be associated with abdominal surgical procedures and peritoneal dialysis. Sepsis is the major cause of death from peritonitis (shock, from sepsis or hypovolemia). Intestinal obstruction from bowel adhesions may develop.

Clinical Manifestations

Clinical features depend on the location and extent of inflammation.

- Diffuse pain becomes constant, localized, and more intense near site of the process.
- Pain is aggravated by movement.
- Affected area of the abdomen becomes extremely tender and distended, and muscles become rigid.
- Rebound tenderness and paralytic ileus may be present.
- Anorexia, nausea, and vomiting occur and peristalsis is diminished.
- Temperature and pulse increase; hypotension may develop.

Assessment and Diagnostic Methods

- Leukocytes (elevated) and serum electrolytes (altered potassium, sodium and chloride)
- Abdominal x-rays, ultrasound, CT scan, MRI, and peritoneal aspiration with culture and sensitivity studies

Medical Management

- Fluid, colloid, and electrolyte replacement with an isotonic solution is the major focus of medical management.

- Analgesics are administered for pain; antiemetics are administered for nausea and vomiting.
- Intestinal intubation and suction are used to relieve abdominal distention.
- Oxygen therapy by nasal cannula or mask is instituted to improve ventilatory function.
- Occasionally, airway intubation and ventilatory assistance are required.
- Massive antibiotic therapy may be instituted (sepsis is the major cause of death).
- Surgical objectives include removal of infected material; surgery is directed toward excision (appendix), resection (intestine), repair (perforation), or drainage (abscess).

Nursing Management

- Monitor the patient's blood pressure by arterial line if shock is present.
- Monitor central venous or pulmonary artery pressures and urine output frequently.
- Provide ongoing assessment of pain, GI function, and fluid and electrolyte balance.
- Assess nature of pain, location in the abdomen, and shifts of pain and location.
- Administer analgesic medication and position for comfort (eg, on side with knees flexed to decrease tension on abdominal organs).
- Record intake and output and CVP and/or pulmonary artery pressures.
- Administer and monitor IV fluids closely; nasogastric intubation may be necessary.
- Observe for decrease in temperature and pulse rate, softening of the abdomen, return of peristaltic sounds, and passage of flatus and bowel movements, which indicate peritonitis is subsiding.
- Increase food and oral fluids gradually, and decrease parenteral fluid intake when peritonitis subsides.
- Observe and record character of drainage from postoperative wound drains if inserted; take care to avoid dislodging drains.

- Postoperatively, prepare patient and family for discharge; teach care of incision and drains if still in place at discharge.
- Refer for home care if necessary.

For more information, see Chapter 38 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Pharyngitis, Acute

Acute pharyngitis, commonly referred to as a "sore throat," is a sudden painful inflammation of the pharynx, caused mostly by viral infections, with bacterial infections accounting for the remainder of cases. When group A streptococci cause acute pharyngitis, the condition is known as strep throat. The inflammatory response results in pain, fever, vasodilation, edema, and tissue damage, manifested by redness and swelling in the tonsillar pillars, uvula, and soft palate. Uncomplicated viral infections usually subside within 3 to 10 days. Pharyngitis caused by more virulent bacteria is a more severe illness because of dangerous complications (eg, sinusitis, otitis media, peritonsillar abscess, mastoiditis, and cervical adenitis). In rare cases, the infection may lead to bacteremia, pneumonia, meningitis, rheumatic fever, and nephritis.

Clinical Manifestations

- Fiery-red pharyngeal membrane and tonsils.
- Lymphoid follicles swollen and freckled with white-purple exudate.
- Cervical lymph nodes enlarged and tender.
- Fever, malaise, and sore throat.
- Hoarseness.

Assessment and Diagnostic Methods

- Swab specimens obtained from posterior pharynx and tonsils (tongue not included).
- Rapid streptococcal antigen test (RSAT) used with professional clinical evaluation.
- Back-up culture of negative rapid antigen tests.

Medical Management

Viral pharyngitis is treated with supportive measures, whereas antibiotic agents are used to treat pharyngitis caused by bacteria: penicillin (5 days) for group A streptococci and cephalosporins and macrolides (from 3 to 10 days) for patients with penicillin allergies or erythromycin resistance. In addition, liquid or soft diet is recommended during the acute stage. In severe instances, IV fluids are administered if the patient cannot swallow. If the patient can swallow, he or she is encouraged to drink at least 2 to 3 L of fluid daily.

Analgesic medications (eg, aspirin or acetaminophen [Tylenol]) can be given at 4- to 6-hour intervals; if required, acetaminophen with codeine can be taken three or four times daily.

Nursing Management

- Encourage bed rest during febrile stage of illness; instruct frequent rest periods once patient is up and about.
- Instruct patient about secretion precautions (eg, disposing of used tissues properly) to prevent spread of infection.
- Examine skin once or twice daily for possible rash because acute pharyngitis may precede some other communicable disease (eg, rubella).
- Administer warm saline gargles or irrigations (105°F to 110°F [40.6°C to 43.3°C]) to ease pain. Also instruct patient regarding purpose and technique for warm gargles (as warm as patient can tolerate) to promote maximum effectiveness.
- Apply an ice collar for symptomatic relief.
- Perform mouth care to prevent fissures of lips and inflammation in the mouth.
- Permit gradual resumption of activity.
- Advise patient of importance of taking the full course of antibiotic therapy.
- Inform patient and family of symptoms to watch for that may indicate development of complications, including nephritis and rheumatic fever.

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For more information, see Chapter 22 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Pharyngitis, Chronic

Chronic pharyngitis is common in adults who work or live in dusty surroundings, use their voice to excess, suffer from chronic cough, and habitually use alcohol and tobacco. Three types are recognized: hypertrophic, a general thickening and congestion of the pharyngeal mucous membranes; atrophic, a late stage of type 1; and chronic granular, marked by numerous swollen lymph follicles of the pharyngeal wall.

Clinical Manifestations

- Constant sense of irritation or fullness in the throat
- Mucus that collects in the throat and is expelled by coughing
- Difficulty in swallowing

Medical Management

Treatment is based on symptom relief; avoidance of exposure to irritants; and correction of any upper respiratory, pulmonary, or cardiac condition that might be responsible for chronic cough. Nasal sprays or medications containing ephedrine sulfate or phenylephrine hydrochloride are used to relieve nasal congestion. Aspirin (for patients older than 20 years) or acetaminophen may be recommended to control inflammation and relieve discomfort. Tonsillectomy may be an effective option, if consideration is given to morbidity and complications relating to the surgery.

Nursing Management

- Advise patient to avoid contact with others until fever has subsided completely to prevent infection from spreading.
- Instruct patient to avoid alcohol, tobacco, secondhand smoke, exposure to cold, and environmental and occupational pollutants. Suggest wearing a disposable mask for protection.
- Encourage patient to drink plenty of fluids, and encourage gargling with warm salt water to relieve throat discomfort. Using lozenges may help to keep the throat moist.

For more information, see Chapter 22 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Pheochromocytoma

A pheochromocytoma is a tumor (usually benign) that originates from the chromaffin cells of the adrenal medulla. In 90% of patients, the tumor arises in the medulla; in the remaining patients, it occurs in the extra-adrenal chromaffin tissue located in or near the aorta, ovaries, spleen, or other organs. It occurs at any age, but peak incidence is between 40 and 50 years of age; it affects men and women equally and has familial tendencies. Ten percent of the tumors are bilateral, and 10% are malignant. Although uncommon, it is one cause of hypertension that is usually cured by surgery, but without detection and treatment it is usually fatal.

Clinical Manifestations

- The typical triad of symptoms is headache, diaphoresis, and palpitations in the patient with hypertension.
- Hypertension (intermittent or persistent) and other cardiovascular disturbances are common.
- Other symptoms may include tremor, headache, flushing, and anxiety.
- Hyperglycemia may result from conversion of liver and muscle glycogen to glucose due to epinephrine secretion; insulin may be required to maintain normal blood glucose levels.

Symptoms of Paroxysmal Form of Pheochromocytoma

- Acute, unpredictable attacks, lasting seconds or several hours, during which patient is extremely anxious, tremulous, and weak; symptoms usually begin abruptly and subside slowly.
- Headache, vertigo, blurring of vision, tinnitus, air hunger, and dyspnea.
- Polyuria, nausea, vomiting, diarrhea, abdominal pain, and feeling of impending doom.
- Palpitations and tachycardia.
- Life-threatening blood pressure elevation (more than 250/150 mm Hg).
- Postural hypotension (decrease in systolic blood pressure, lightheadedness, dizziness on standing).

Assessment and Diagnostic Methods

- Measurements of urine and plasma levels of catecholamines and metanephrine (MN), a catecholamine metabolite, are the most direct and conclusive tests for overactivity of the adrenal medulla.
- A clonidine suppression test may be performed if the results of plasma and urine tests of catecholamines are inconclusive.
- Imaging studies (eg, CT and MRI scans, ultrasound, ^{131}I-metaiodobenzylguanidine [MIBG] scintigraphy) to localize the pheochromocytoma and to determine whether more than one tumor is present.

Medical Management

- Bed rest with the head of the bed elevated is recommended.
- The patient may be moved to the intensive care unit for close monitoring of ECG changes and careful administration of alpha-adrenergic blocking agents (eg, phentolamine [Regitine]) or smooth muscle relaxants (eg, sodium nitroprusside [Nipride]) to lower the blood pressure quickly.
- Treatment is surgical removal of the tumor, usually with adrenalectomy (hypertension usually subsides with treatment); patient preparation includes control of blood pressure and blood volumes; usually this is carried out over 4 to 7 days.
- Patient is hydrated before, during, and after surgery; use of sodium nitroprusside (Nipride) and alpha-adrenergic blocking agents may be required during and after surgery.
- Postoperative corticosteroid replacement is required after bilateral adrenalectomy.
- Careful attention is directed toward monitoring and treating hypotension and hypoglycemia.
- Several days after surgery, urine and plasma levels of catecholamines and their metabolites are measured to determine whether the surgery was successful.

Nursing Management

- Monitor ECG changes, arterial pressures, fluid and electrolyte balance, and blood glucose levels.
- Encourage patient to schedule follow-up appointments to ensure that pheochromocytoma does not recur undetected.

- Instruct the patient about the purpose of corticosteroids, the medication schedule, and the risks of skipping doses or stopping their administration abruptly.
- Teach the patient and family how to measure the patient's blood pressure and when to notify the physician about changes in blood pressure.
- Give verbal and written instructions on collecting 24-hour urine specimen.
- Refer for home care nurse if indicated.
- Give encouragement and support, because patient may be fearful of repeated attacks.

For more information, see Chapter 42 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Pituitary Tumors

Pituitary tumors are of three principal types, representing an overgrowth of eosinophilic cells, basophilic cells (hyperadrenalism), or chromophobic cells (cells with no affinity for either eosinophilic or basophilic stains). They are usually benign.

Clinical Manifestations

Eosinophilic Tumors Developing Early in Life

- Gigantism: patient may be more than 7 ft tall and large in all proportions.
- Patient is weak and lethargic, hardly able to stand.

Eosinophilic Tumors Developing in Adulthood

- Acromegaly (excessive skeletal growth of the feet, hands, superciliary ridge, molar eminences, nose, and chin)
- Enlargement of every tissue and organ of the body
- Severe headaches and visual disturbances because the tumors exert pressure on the optic nerves
- Loss of color discrimination, diplopia (double vision), or blindness of a portion of the field of vision
- Decalcification of the skeleton, muscular weakness, and endocrine disturbances, similar to those occurring in hyperthyroidism

Basophilic Tumors

Cushing's syndrome: masculinization and amenorrhea in females, truncal obesity, hypertension, osteoporosis, and polycythemia

Chromophobic Tumors (90% of Pituitary Tumors)

Symptoms of hypopituitarism include the following:

- Obesity and somnolence
- Fine, scanty hair; dry, soft skin; a pasty complexion; and small bones
- Headaches, loss of libido, and visual defects progressing to blindness
- Polyuria, polyphagia, lowering of the basal metabolic rate, and subnormal body temperature

Assessment and Diagnostic Methods

- History and physical examination (visual field assessment)
- CT and MRI
- Serum levels of pituitary hormone

Medical Management of Pituitary Tumors and Acromegaly

- Surgical removal through a transsphenoidal approach is the treatment of choice.
- Stereotactic radiation therapy is used to deliver external-beam radiation therapy to the tumor with minimal effect on normal tissue.
- Conventional radiation therapy and the use of bromocriptine (dopamine agonist) and octreotide (somatostatin analogue) inhibit production or release of growth hormone.
- Hypophysectomy is used to remove primary tumors surgically.

For more information, see Chapter 42 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Pleural Effusion

Pleural effusion, a collection of fluid in the pleural space, is usually secondary to other diseases (eg, pneumonia, pulmonary

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infections, nephrotic syndrome, connective tissue disease, neoplastic tumors, congestive HF). The effusion can be relatively clear fluid (a transudate or an exudates) or it can be blood or pus. Pleural fluid accumulates due to an imbalance in hydrostatic or oncotic pressures (transudate) or as a result of inflammation by bacterial products or tumors (exudate).

Clinical Manifestations

Some symptoms are caused by the underlying disease. Pneumonia causes fever, chills, and pleuritic chest pain. Malignant effusion may result in dyspnea and coughing. The size of the effusion, the speed of its formation, and the underlying lung disease determine the severity of symptoms.

- Large effusion: shortness of breath to acute respiratory distress.
- Small to moderate effusion: Dyspnea may not be present.
- Dullness or flatness to percussion over areas of fluid, minimal or absence of breath sounds, decreased fremitus, and tracheal deviation away from the affected side.

Assessment and Diagnostic Methods

- Physical examination
- Chest x-rays (lateral decubitus)
- Chest CT scan
- Thoracentesis
- Pleural fluid analysis (culture, chemistry, cytology)
- Pleural biopsy

Medical Management

Objectives of treatment are to discover the underlying cause; to prevent reaccumulation of fluid; and to relieve discomfort, dyspnea, and respiratory compromise. Specific treatment is directed at the underlying cause.

- Thoracentesis is performed to remove fluid, collect specimen for analysis, and relieve dyspnea.
- Chest tube and water-seal drainage may be necessary for drainage and lung reexpansion.
- Chemical pleurodesis: Adhesion formation is promoted when drugs are instilled into the pleural space to obliterate the space and prevent further accumulation of fluid.

- Other treatment modalities include surgical pleurectomy (insertion of a small catheter attached to a drainage bottle) or implantation of a pleuroperitoneal shunt.

Nursing Management

- Implement medical regimen: Prepare and position patient for thoracentesis and offer support throughout the procedure.
- Monitor chest tube drainage and water-seal system; record amount of drainage at prescribed intervals.
- Administer nursing care related to the underlying cause of the pleural effusion.

See "Nursing Management" under the disorder describing the underlying condition.

- Assist patient in pain relief. Assist patient to assume positions that are least painful. Administer pain medication as prescribed and needed to continue frequent turning and ambulation.
- If the patient is to be managed as an outpatient with a pleural catheter for drainage, educate the patient and family about management and care of the catheter and drainage system.

For more information, see Chapter 23 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Pleurisy

Pleurisy refers to inflammation of both the visceral and parietal pleurae. When inflamed, pleural membranes rub together, the result is severe, sharp, knifelike pain with breathing that is intensified on inspiration. Pleurisy may develop in conjunction with pneumonia or an upper respiratory tract infection, TB, or collagen disease; after trauma to the chest, pulmonary infarction, or pulmonary embolism (PE); in patients with primary or metastatic cancer; and after thoracotomy.

Clinical Manifestations

- Pain usually occurs on one side and worsens with deep breaths, coughing, or sneezing.

- Pain is decreased when the breath is held. Pain is localized or radiates to the shoulder or abdomen.
- As pleural fluid develops, pain lessens. A friction rub can be auscultated but disappears as fluid accumulates.

Assessment and Diagnostic Methods

- Auscultation for pleural friction rub
- Chest x-rays
- Sputum culture
- Thoracentesis for pleural fluid examination, pleural biopsy (less common)

Medical Management

Objectives of management are to discover the underlying condition causing the pleurisy and to relieve the pain.

- Patient is monitored for signs and symptoms of pleural effusion: shortness of breath, pain, assumption of a position that decreases pain, and decreased chest wall excursion.
- Prescribed analgesics, such as NSAIDs, are given to relieve pain and allow effective coughing.
- Applications of heat or cold are provided for symptomatic relief.
- An intercostal nerve block is done for severe pain.

Nursing Management

- Enhance comfort by turning patient frequently on affected side to splint chest wall.
- Teach patient to use hands or pillow to splint rib cage while coughing.

See "Nursing Management" under "Pneumonia" for additional information.

For more information, see Chapter 23 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Pneumonia

Pneumonia is an inflammation of the lung parenchyma caused by various microorganisms, including bacteria, mycobacteria,

fungi, and viruses. Pneumonias are classified as community-acquired pneumonia (CAP), hospital-acquired (nosocomial) pneumonia (HAP), pneumonia in the immunocompromised host, and aspiration pneumonia. There is overlap in how specific pneumonias are classified, because they may occur in differing settings. Those at risk for pneumonia often have chronic underlying disorders, severe acute illness, a suppressed immune system from disease or medications, immobility, and other factors that interfere with normal lung protective mechanisms. The elderly are also at high risk.

Pathophysiology

An inflammatory reaction can occur in the alveoli, producing an exudate that interferes with the diffusion of oxygen and carbon dioxide; bronchospasm may also occur if the patient has reactive airway disease. Bronchopneumonia, the most common form, is distributed in a patchy fashion extending from the bronchi to surrounding lung parenchyma. Lobar pneumonia is the term used if a substantial part of one or more lobes is involved. Pneumonias are caused by a variety of microbial agents in the various settings. Common organisms include *Pseudomonas aeruginosa* and *Klebsiella* species; *Staphylococcus aureus*; *Haemophilus influenzae*; *Staphylococcus pneumoniae*; and enteric Gram-negative bacilli, fungi, and viruses (most common in children).

Clinical Manifestations

Clinical features vary depending on the causative organism and the patient's disease.

- Sudden chills and rapidly rising fever (38.5°C to 40.5°C [101°F to 105°F]).
- Pleuritic chest pain aggravated by respiration and coughing.
- Severely ill patient has marked tachypnea (25 to 45 breaths/min) and dyspnea; orthopnea when not propped up.
- Pulse rapid and bounding; may increase 10 beats/min per degree of temperature elevation (Celsius).
- A relative bradycardia for the amount of fever suggests viral infection, mycoplasma infection, or infection with a *Legionella* organism.

- Other signs: upper respiratory tract infection, headache, low-grade fever, pleuritic pain, myalgia, rash, and pharyngitis; after a few days, mucoid or mucopurulent sputum is expectorated.
- Severe pneumonia: flushed cheeks; lips and nail beds demonstrating central cyanosis.
- Sputum purulent, rusty, blood-tinged, viscous, or green depending on etiologic agent.
- Appetite is poor, and the patient is diaphoretic and tires easily.
- Signs and symptoms of pneumonia may also depend on a patient's underlying condition (eg, different signs occur in patients with conditions such as cancer, and in those who are undergoing treatment with immunosuppressants, which decrease the resistance to infection).

Assessment and Diagnostic Methods

- Primarily history, physical examination
- Chest x-rays, blood and sputum cultures, Gram stain

Gerontologic Considerations

Pneumonia in elderly patients may occur as a primary diagnosis or as a complication of a chronic disease. Pulmonary infections in older people frequently are difficult to treat and result in a higher mortality rate than in younger people. General deterioration, weakness, abdominal symptoms, anorexia, confusion, tachycardia, and tachypnea may signal the onset of pneumonia. The diagnosis of pneumonia may be missed because the classic symptoms of cough, chest pain, sputum production, and fever may be absent or masked in elderly patients. Also, the presence of some signs may be misleading. Abnormal breath sounds, for example, may be caused by microatelectasis that occurs as a result of decreased mobility, decreased lung volumes, or other respiratory function changes. Chest x-rays may be needed to differentiate chronic HF from pneumonia as the cause of clinical signs and symptoms.

Supportive treatment includes hydration (with caution and with frequent assessment because of the risk of fluid overload in the elderly); supplemental oxygen therapy; and assistance with deep breathing, coughing, frequent position changes, and

early ambulation. To reduce or prevent serious complications of pneumonia in the elderly, vaccination against pneumococcal and influenza infections is recommended.

Medical Management

- Antibiotics are prescribed on the basis of Gram stain results and antibiotic guidelines (resistance patterns, risk factors, etiology must be considered). Combination therapy may also be used.
- Supportive treatment includes hydration, antipyretics, antitussive medications, antihistamines, or nasal decongestants.
- Bed rest is recommended until infection shows signs of clearing.
- Oxygen therapy is given for hypoxemia.
- Respiratory support includes high inspiratory oxygen concentrations, endotracheal intubation, and mechanical ventilation.
- Treatment of atelectasis, pleural effusion, shock, respiratory failure, or superinfection is instituted, if needed.
- For groups at high risk for CAP, pneumococcal vaccination is advised.

NURSING PROCESS

The Patient with Pneumonia

Assessment

- Assess for fever, chills, night sweats; pleuritic-type pain, fatigue, tachypnea, use of accessory muscles for breathing, bradycardia or relative bradycardia, coughing, and purulent sputum.
- Monitor the patient for the following: changes in temperature and pulse; amount, odor, and color of secretions; frequency and severity of cough; degree of tachypnea or shortness of breath; changes in physical assessment findings (primarily assessed by inspecting and auscultating the chest); and changes in the chest x-ray findings.
- Assess the elderly patient for unusual behavior, altered mental status, dehydration, excessive fatigue, and concomitant HF.

Diagnosis

Nursing Diagnoses

- Ineffective airway clearance related to copious tracheobronchial secretions
- Activity intolerance related to impaired respiratory function
- Risk for deficient fluid volume related to fever and a rapid respiratory rate
- Imbalanced nutrition: less than body requirements
- Deficient knowledge about treatment regimen and preventive health measures

Collaborative Problems/Potential Complications

- Continuing symptoms after initiation of therapy
- Shock
- Respiratory failure
- Atelectasis
- Pleural effusion
- Confusion

Planning and Goals

The major goals of the patient may include improved airway patency, rest to conserve energy, maintenance of proper fluid volume, maintenance of adequate nutrition, an understanding of the treatment protocol and preventive measures, and absence of complications.

Nursing Interventions

Improving Airway Patency

- Encourage hydration: fluid intake (2 to 3 L/day) to loosen secretions.
- Provide humidified air using high-humidity face mask.
- Encourage patient to cough effectively, and provide correct positioning, chest physiotherapy, and incentive spirometry.
- Provide nasotracheal suctioning if necessary.
- Provide appropriate method of oxygen therapy.
- Monitor effectiveness of oxygen therapy.

Promoting Rest and Conserving Energy

- Encourage the debilitated patient to rest and avoid overexertion and possible exacerbation of symptoms.
- Patient should assume a comfortable position to promote rest and breathing (eg, semi-Fowler's position) and should

change positions frequently to enhance secretion clearance and pulmonary ventilation and perfusion.
- Instruct outpatients not to overexert themselves and to engage in only moderate activity during the initial phases of treatment.

Promoting Fluid Intake and Maintaining Nutrition
- Encourage fluids (2 L/day minimum with electrolytes and calories).
- Administer IV fluids and nutrients, if necessary.

Promoting Patients' Knowledge
- Instruct on cause of pneumonia, management of symptoms, signs and symptoms that should be reported to the physician or nurse, and the need for follow-up.
- Explain treatments in simple manner and using appropriate language; provide written instructions and information and alternative formats for patients with hearing or vision loss.
- Repeat instructions and explanations as needed.

Monitoring and Preventing Potential Complications
- Monitoring for continuing symptoms of pneumonia (patients usually begin to respond to treatment within 24 to 48 hours after antibiotic therapy is initiated).
- Assess for signs and symptoms of shock, multisystem organ failure, and respiratory failure (eg, evaluate vital signs, pulse oximetry, and hemodynamic monitoring parameters).
- Assess for atelectasis and pleural effusion.
- Assist with thoracentesis, and monitor patient for pneumothorax after procedure.
- Assess for confusion or cognitive changes; assess underlying factors.

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE
- Instruct patient to continue taking full course of antibiotics as prescribed; teach the patient about their proper administration and potential side effects.
- Instruct patient about symptoms that require contacting the health care provider: difficulty breathing, worsening cough, recurrent/increasing fever, and medication intolerance.

- Advise patient to increase activities gradually after fever subsides.
- Advise patient that fatigue and weakness may linger.
- Encourage breathing exercises to promote lung expansion and clearing.
- Encourage follow-up chest x-rays.
- Encourage patient to stop smoking.
- Instruct patient to avoid stress, fatigue, sudden changes in temperature, and excessive alcohol intake, all of which lower resistance to pneumonia.
- Review principles of adequate nutrition and rest.
- Recommend influenza vaccine (Pneumovax) to all patients at risk.
- Refer patient for home care to facilitate adherence to therapeutic regimen, as indicated.

For more information, see Chapter 23 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Pneumothorax and Hemothorax

Pneumothorax occurs when the parietal or visceral pleura is breached and the pleural space is exposed to positive atmospheric pressure. Normally the pressure in the pleural space is negative or subatmospheric; this negative pressure is required to maintain lung inflation. When either pleura is breached, air enters the pleural space, and the lung or a portion of it collapses. Hemothorax is the collection of blood in the chest cavity because of torn intercostal vessels or laceration of the lungs injured through trauma. Often both blood and air are found in the chest cavity (hemopneumothorax).

Types of Pneumothorax

Simple Pneumothorax

A simple, or spontaneous, pneumothorax occurs when air enters the pleural space through a breach of either the parietal

or visceral pleura. Most commonly this occurs as air enters the pleural space through the rupture of a bleb or a bronchopleural fistula. A spontaneous pneumothorax may occur in an apparently healthy person in the absence of trauma due to rupture of an air-filled bleb, or blister, on the surface of the lung, allowing air from the airways to enter the pleural cavity. It may be associated with diffuse interstitial lung disease and severe emphysema.

Traumatic Pneumothorax

A traumatic pneumothorax occurs when air escapes from a laceration in the lung itself and enters the pleural space or from a wound in the chest wall. It may result from blunt trauma (eg, rib fractures), penetrating chest or abdominal trauma (eg, stab wounds or gunshot wounds), or diaphragmatic tears. Traumatic pneumothorax may occur during invasive thoracic procedures (ie, thoracentesis, transbronchial lung biopsy, insertion of a subclavian line) in which the pleura is inadvertently punctured, or with barotrauma from mechanical ventilation. A traumatic pneumothorax resulting from major injury to the chest is often accompanied by hemothorax. Open pneumothorax is one form of traumatic pneumothorax. It occurs when a wound in the chest wall is large enough to allow air to pass freely in and out of the thoracic cavity with each attempted respiration.

NURSING ALERT

Traumatic open pneumothorax calls for emergency interventions. Stopping the flow of air through the opening in the chest wall is a life-saving measure.

Tension Pneumothorax

A tension pneumothorax occurs when air is drawn into the pleural space and is trapped with each breath. Tension builds up in the pleural space, causing lung collapse. Mediastinal shift (shift of the heart and great vessels and trachea toward the unaffected side of the chest) is a life-threatening medical emergency. Both respiratory and circulatory functions are compromised.

Clinical Manifestations

Signs and symptoms associated with pneumothorax depend on its size and cause:

- Pleuritic pain of sudden onset.
- Minimal respiratory distress with small pneumothorax; acute respiratory distress if large.
- Anxiety, dyspnea, air hunger, use of accessory muscles, and central cyanosis (with severe hypoxemia).
- In a simple pneumothorax, the trachea is midline, expansion of the chest is decreased, breath sounds may be diminished, and percussion of the chest may reveal normal sounds or hyperresonance depending on the size of the pneumothorax.
- In a tension pneumothorax, the trachea is shifted away from the affected side, chest expansion may be decreased or fixed in a hyperexpansion state, breath sounds are diminished or absent, and percussion to the affected side is hyperresonant. The clinical picture is one of air hunger, agitation, increasing hypoxemia, central cyanosis, hypotension, tachycardia, and profuse diaphoresis.

Medical Management

The goal is evacuation of air or blood from the pleural space.

- A small chest tube is inserted near the second intercostal space for a pneumothorax.
- A large-diameter chest tube is inserted, usually in the fourth or fifth intercostal space, for hemothorax.
- Autotransfusion is begun if excessive bleeding from chest tube occurs.
- Traumatic open pneumothorax is plugged (petroleum gauze); patient is asked to inhale and strain against a closed glottis to eject air from the thorax until the chest tube is inserted, with water-seal drainage.
- Antibiotics are usually prescribed to combat infection from contamination.
- The chest wall is opened surgically (thoracotomy) if more than 1,500 mL of blood is aspirated initially by thoracentesis (or is the initial chest tube output) or if chest tube output

continues at greater than 200 mL/h. Urgency is determined by the degree of respiratory compromise.

- An emergency thoracotomy may also be performed in the emergency department if a cardiovascular injury secondary to chest or penetrating trauma is suspected.
- The patient with a possible tension pneumothorax should immediately be given a high concentration of supplemental oxygen to treat the hypoxemia, and pulse oximetry should be used to monitor oxygen saturation.
- In an emergency situation, a tension pneumothorax can be decompressed or quickly converted to a simple pneumothorax by inserting a large-bore needle (14-gauge) at the second intercostal space, midclavicular line on the affected side. A chest tube is then inserted and connected to suction to remove the remaining air and fluid, reestablish the negative pressure, and reexpand the lung.

Nursing Management

- Promote early detection through assessment and identification of high-risk population; report symptoms.
- Assist in chest tube insertion; maintain chest drainage or water-seal.
- Monitor respiratory status and reexpansion of lung, with interventions (pulmonary support) performed in collaboration with other health care professionals (eg, physician, respiratory therapist, physical therapist).
- Provide information and emotional support to patient and family.

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For more information, see Chapter 23 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Polycythemia

Polycythemia is an increased volume of red blood cells. The hematocrit is elevated by more than 55% in men or more than 50% in women. Polycythemia is classified as either primary or secondary.

Secondary Polycythemia

Secondary polycythemia is caused by excessive production of erythropoietin. This may occur in response to a hypoxic stimulus, as in COPD or cyanotic heart disease, or in certain hemoglobinopathies in which the hemoglobin has an abnormally high affinity for oxygen, or it can occur from a neoplasm, such as renal cell carcinoma. Management of secondary polycythemia involves treatment of the primary problem. If the cause cannot be corrected, phlebotomy may be necessary to reduce hypervolemia and hyperviscosity.

Polycythemia Vera (Primary)

Polycythemia vera, or primary polycythemia, is a proliferative disorder a proliferative disorder of the myeloid stem cells. The bone marrow is hypercellular, and the erythrocyte, leukocyte, and platelet counts in the peripheral blood are elevated. Diagnosis is based on an elevated erythrocyte mass, a normal oxygen saturation level, and often an enlarged spleen. The erythropoietin level may not be as low as would be expected with an elevated hematocrit.

Clinical Manifestations

Patients typically have a ruddy complexion and splenomegaly. The symptoms are due to the increased blood volume (headache, dizziness, tinnitus, fatigue, paresthesias, and blurred vision) or to increased blood viscosity (angina, claudication, dyspnea, and thrombophlebitis). Blood pressure and uric acid are often elevated, and pruritus is another common and bothersome complication. Erythromelalgia (a burning sensation in the fingers and toes) may be reported.

Medical Management

The objective of management is to reduce the high red blood cell mass.

- Phlebotomy is performed repeatedly to keep the hemoglobin within normal range; iron supplements are avoided.
- Chemotherapeutic agents are used to suppress marrow function (may increase risk for leukemia).

- Anagrelide (Agrylin) may be used to inhibit platelet aggregation and control the thrombocytosis related to polycythemia.
- Interferon alpha-2b (Intron-A) is the most effective treatment for managing the pruritus associated with polycythemia vera.
- Antihistamines may be administered to control pruritus (not very effective).
- Allopurinol is used to prevent gouty attacks when the uric acid level is elevated.

Nursing Management

- Assess risk factors for thrombotic complications and teach patient to recognize signs and symptoms of thrombosis.
- Discourage sedentary behavior, crossing the legs, and wearing tight or restrictive clothing (particularly stockings) to reduce the likelihood of DVT.
- Advise patient to avoid aspirin and medications containing aspirin (if patient has a history of bleeding).
- Advise patient to minimize alcohol intake and avoid iron and vitamins containing iron.
- Suggest a cool or tepid bath for pruritus, along with cocoa butter–based lotions and bath products to relieve itching.

For more information, see Chapter 33 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Prostatitis

Prostatitis is an inflammation of the prostate gland that is often associated with lower urinary tract symptoms and symptoms of sexual discomfort and dysfunction. Prostatitis may be caused by infectious agents (bacteria, fungi, mycoplasma) or other conditions (eg, urethral stricture, benign prostatic hyperplasia). *E. coli* is the most commonly isolated organism. There are four types of prostatitis: acute bacterial prostatitis (type I); chronic bacterial prostatitis (type II); chronic prostatitis/chronic pelvic pain syndrome (CP/CPPS) (type III), and asymptomatic inflammatory prostatitis (type IV).

Clinical Manifestations

- Acute prostatitis is characterized by the sudden onset of fever, dysuria, perineal prostatic pain, and severe lower urinary tract symptoms: dysuria, frequency, urgency, hesitancy, and nocturia.
- Approximately 5% of cases of type I prostatitis (acute prostatitis) progress to type II prostatitis (chronic bacterial prostatitis); patients with type II disease are typically asymptomatic between episodes.
- Patients with type III prostatitis often have no bacteria in the urine in the presence of genitourinary pain.
- Patients with type IV prostatitis are usually diagnosed incidentally during a workup for infertility, an elevated prostate-specific antigen (PSA) test, or other disorders.

Medical Management

The goal of treatment is to eradicate the causal organisms. Specific treatment is based on the type of prostatitis and on the results of culture and sensitivity testing of the urine.

- If bacteria are cultured from the urine, antibiotics, including trimethoprim-sulfamethoxazole (TMP-SMZ) or a fluoroquinolone (eg, ciprofloxacin [Cipro]), may be prescribed, and continuous therapy with low-dose antibiotics may be used to suppress the infection.
- If the patient is afebrile and has a normal urinalysis, anti-inflammatory agents may be used; alpha-adrenergic blocker therapy (eg, tamsulosin [Flomax]), may be prescribed to promote bladder and prostate relaxation.
- Supportive, nonpharmacologic therapies may be prescribed (eg, biofeedback, pelvic floor training, physical therapy, sitz baths, stool softeners).

Nursing Management

- Administer antibiotics as prescribed.
- Recommend comfort measures: analgesics, sitz baths for 10 to 20 minutes several times daily.
- Instruct patient to complete prescribed course of antibiotics and recognize recurrent signs and symptoms of prostatitis.

- Encourage fluids to satisfy thirst but do not "force" them, because effective drug levels must be maintained in urine.
- Instruct patient to avoid foods and drinks that have diuretic action or increase prostatic secretions, including alcohol, coffee, tea, chocolate, cola, and spices.
- Instruct patient to avoid sexual arousal and intercourse during periods of acute inflammation.
- Advise patient to avoid sitting for long periods to minimize discomfort.
- Emphasize that medical follow-up is necessary for at least 6 months to 1 year.
- Advise patient that the urinary tract infection (UTI) may recur and is taught to recognize its symptoms.

For more information, see Chapter 49 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Pruritus

Pruritus (itching) is one of the most common dermatologic complaints. Scratching the itchy area causes the inflamed cells and nerve endings to release histamine, which produces more pruritus and, in turn, a vicious itch–scratch cycle. Scratching can result in altered skin integrity with excoriation, redness, raised areas (wheals), infection, or changes in pigmentation. Although pruritus usually is due to primary skin disease, it may also reflect systemic internal disease, such as diabetes mellitus; renal, hepatic, thyroid, or blood disorders; or cancer. Pruritus may be caused by certain oral medications (aspirin, antibiotics, hormones, opioids), contact with irritating agents (soaps, chemicals), or prickly heat (miliaria). It may also be a side effect of radiation therapy, a reaction to chemotherapy, or a symptom of infection. It may occur in elderly patients as a result of dry skin. It may also be caused by psychological factors (emotional stress).

Clinical Manifestations

- Itching and scratching, often more severe at night (itch–scratch–itch cycle)
- Excoriations, redness, raised areas on the skin (wheals), as a result of scratching
- Infections or changes in pigmentation
- Debilitating itching, in severe cases

Medical Management

The cause of pruritus needs to be identified and treated. The patient is advised to avoid washing with soap and hot water. Cold compresses, ice cubes, or cool agents that contain soothing menthol and camphor may be applied.

- Bath oils (Lubath or Alpha Keri) are prescribed, except for elderly patients or those with impaired balance, who should not add oil to the bath because of the danger of slipping.
- Topical corticosteroids are prescribed to decrease itching.
- Oral antihistamines (diphenhydramine [Benadryl]) may be used.
- Tricyclic antidepressants (doxepin [Sinequan]) may be prescribed when pruritus is of neuropsychogenic origin.

Nursing Management

- Reinforce reasons for the prescribed therapeutic regimen.
- Remind patient to use tepid (not hot) water and to shake off excess water and blot between intertriginous areas (body folds) with a towel.
- Advise patient to avoid rubbing vigorously with towel, which overstimulates skin, causing more itching.
- Lubricate skin with an emollient that traps moisture (specifically after bathing).
- Advise patient to avoid situations that cause vasodilation (warm environment, ingestion of alcohol, or hot foods and liquids).
- Keep room cool and humidified.
- Advise patient to wear soft cotton clothing next to skin and avoid activities that result in perspiration.
- Instruct patient to avoid scratching and to trim nails short to prevent skin damage and infection.

- When the underlying cause of pruritus is unknown and further testing is required, explain each test and the expected outcome.

For more information, see Chapter 56 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Psoriasis

Psoriasis is a chronic, noninfectious, inflammatory disease of the skin in which the production of epidermal cells occurs faster than normal. Onset may occur at any age but is most common between the ages of 15 and 35 years. Main sites of the body affected are the scalp, areas over the elbows and knees, lower part of the back, and genitalia, as well as the nails. Bilateral symmetry often exists. Psoriasis may be associated with asymmetric rheumatoid factor–negative arthritis of multiple joints. An exfoliative psoriatic state may develop in which the disease progresses to involve the total body surface (erythrodermic psoriatic state).

Pathophysiology

The basal skin cells divide too quickly, and the newly formed cells become evident as profuse scales or plaques of epidermal tissue. As a result of the increased number of basal cells and rapid cell passage, the normal events of cell maturation and growth cannot occur, which prevents the normal protective layers of the skin to form. Current evidence supports an immunologic basis for psoriasis. The primary defect is unknown. Periods of emotional stress and anxiety aggravate the condition, and trauma, infections, and seasonal and hormonal changes also are trigger factors.

Clinical Manifestations

Symptoms range from a cosmetic annoyance to a physically disabling and disfiguring affliction.

- Lesions appear as red, raised patches of skin covered with silvery scales.

- If scales are scraped away, the dark red base of lesion is exposed, with multiple bleeding points.
- Patches are dry and may or may not itch.
- The condition may involve nail pitting, discoloration, crumbling beneath the free edges, and separation of the nail plate.
- In erythrodermic psoriasis, the patient is acutely ill, with fever, chills, and an electrolyte imbalance.

Psychological Considerations

- Psoriasis may cause despair and frustration; observers may stare, comment, ask embarrassing questions, or even avoid the person.
- The condition can eventually exhaust resources, interfere with work, and negatively affect many aspects of life.
- Teenagers are especially vulnerable to its psychological effects.

Assessment and Diagnostic Methods

- Presence of classic plaque-type lesions (change histologically progressing from early to chronic plaques)
- Signs of nail and scalp involvement and positive family history

Medical Management

Goals of management are to slow the rapid turnover of epidermis, to promote resolution of the psoriatic lesions, and to control the natural cycles of the disease. There is no known cure. The therapeutic approach should be understandable, cosmetically acceptable, and not too disruptive of lifestyle.

First, any precipitating or aggravating factors are addressed. An assessment is made of lifestyle, because psoriasis is significantly affected by stress. The most important principle of psoriasis treatment is gentle removal of scales (bath oils, coal tar preparations, and a soft brush used to scrub the psoriatic plaques). After bathing, the application of emollient creams containing alpha-hydroxy acids (Lac-Hydrin, Penederm) or salicylic acid will continue to soften thick scales. Three types of therapy are standard: topical, systemic, and phototherapy.

Topical Therapy

- Topical treatment is used to slow the overactive epidermis.
- Topical corticosteroid therapy acts to reduce inflammation.
- Medications include tar preparations (eg, coal tar topical [Balnetar]), alpha-hydroxy or salicylic acid, and corticosteroids. Calcipotriene (Dovonex; not recommended for use by elderly patients because of their more fragile skin, or in pregnant or lactating women); and tazarotene (Tazorac) as well as vitamin D are additional nonsteroidal agents. Occlusive (plastic) dressing may improve effectiveness. Medications may be in the form of lotions, ointments, pastes, creams, and shampoos.

NURSING ALERT

Assess the flammability of any plastic substances used; caution patient not to smoke or go near open flame.

Systemic Therapy

- Biologic agents act by inhibiting activation and migration, eliminating the T cells completely, slowing postsecretory cytokines or inducing immune deviation: infliximab (Remicade), etanercept (Enbrel), efalizumab (Raptiva), alefacept (Amevive), and adalimumab (Humira). Biological agents have significant side effects, making close monitoring essential.
- Oral agents: methotrexate (patients should avoid drinking alcohol, should not be administered to pregnant women), cyclosporine A, oral retinoids (ie, synthetic derivatives of vitamin A and its metabolite, vitamin A acid), etretinate; laboratory studies are monitored to ensure that hepatic, hematopoietic, and renal systems are functioning adequately.

Photochemotherapy

- Psoralens and ultraviolet A (PUVA) therapy may be used for severely debilitating psoriasis.
- Photochemotherapy is associated with long-term risks of skin cancer, cataracts, and premature aging of the skin.

- Ultraviolet B (UVB) light therapy may be used to treat generalized plaque and may be combined with the topical cream, calcipotriene (Dovonex). Excimer laser therapy may be another treatment.

Nursing Management

Assessment

Assessment focuses on how the patient is coping with the skin condition, the appearance of "normal" skin, and the appearance of skin lesions.

- Examine areas especially affected: elbows, knees, scalp, gluteal cleft, and all nails (for small pits.
- Assess the impact of the disease on the patient and the coping strategies used for conducting normal activities and interactions with family and friends.
- Instruct patient that the condition is not infectious, is not a reflection of poor personal hygiene, and is not skin cancer.
- Create an environment in which the patient feels comfortable discussing important quality-of-life issues related to his or her psychosocial and physical response to this chronic illness.

Nursing Interventions

Promoting Understanding

- Explain with sensitivity that there is no cure and that lifetime management is necessary; the disease process can usually be controlled.
- Review pathophysiology of psoriasis and factors that provoke it: any irritation or injury to the skin (cut, abrasion, sunburn), any current illness, emotional stress, unfavorable environment (cold), and drug (caution patient about nonprescription medication).
- Review and explain treatment regimen to ensure compliance; provide patient education materials in addition to face-to-face discussions.

Increasing Skin Integrity

- Advise patient not to pick or scratch areas.
- Encourage patient to prevent the skin from drying out; dry skin causes psoriasis to worsen.

- Inform patient that water should not be too hot and skin should be dried by patting with a towel.
- Teach patient to use bath oil or emollient cleansing agent for sore and scaling skin.

Improving Self-Concept and Body Image

Introduce coping strategies and suggestions for reducing or coping with stressful situations to facilitate a more positive outlook and acceptance of the disease.

Monitoring and Managing Complications

- Psoriatic arthritis: Note joint discomfort and evaluate further.
- Educate patient about care and treatment and need for compliance.
- Consult a rheumatologist to assist in the diagnosis and treatment of the arthropathy.

Promoting Home- and Community-Based Care

Teaching Patients Self-Care

- Advise patient that topical corticosteroid preparations on face and around eyes predispose to cataract development. Follow strict guidelines to avoid overuse.
- Teach patient to avoid exposure to sun when undergoing PUVA treatments; if exposure is unavoidable, the skin must be protected with sunscreen and clothing, and sunglasses should be worn.
- Remind patient to schedule ophthalmic examinations on a regular basis.
- Advise female patients of childbearing age that PUVA therapy is teratogenic (can cause fetal defects). They may want to consider using contraceptives during therapy.
- If indicated, refer to a mental health professional who can help to ease emotional strain and give support.
- Encourage patient to join a support group and to contact the National Psoriasis Foundation for information.

For more information, see Chapter 56 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Pulmonary Edema, Acute

Pulmonary edema is the abnormal accumulation of fluid in the interstitial spaces of the lungs that diffuses into the alveoli. Pulmonary edema is an acute event that results from left ventricular failure. With increased resistance to left ventricular filling, blood backs up into the pulmonary circulation. The patient quickly develops pulmonary edema, sometimes called "flash pulmonary edema," from the blood volume overload in the lungs. Pulmonary edema can also be caused by noncardiac disorders, such as renal failure and other conditions that cause the body to retain fluid. The pathophysiology is similar to that seen in HF, in that the left ventricle cannot handle the volume overload and blood volume and pressure build up in the left atrium. The rapid increase in atrial pressure results in an acute increase in pulmonary venous pressure, which produces an increase in hydrostatic pressure that forces fluid out of the pulmonary capillaries into the interstitial spaces and alveoli. Lymphatic drainage of the excess fluid is ineffective.

Clinical Manifestations

- As a result of decreased cerebral oxygenation, the patient becomes increasingly restless and anxious.
- Along with a sudden onset of breathlessness and a sense of suffocation, the patient's hands become cold and moist, the nail beds become cyanotic (bluish), and the skin turns ashen (gray).
- The pulse is weak and rapid, and the neck veins are distended.
- Incessant coughing may occur, producing increasing quantities of foamy sputum.
- As pulmonary edema progresses, the patient's anxiety and restlessness increase; the patient becomes confused, then stuporous.
- Breathing is rapid, noisy, and moist-sounding; the patient's oxygen saturation is significantly decreased.
- The patient, nearly suffocated by the blood-tinged, frothy fluid filling the alveoli, is literally drowning in secretions. The situation demands emergent action.

Assessment and Diagnostic Methods

- Diagnosis is made by evaluating the clinical manifestations resulting from pulmonary congestion.
- Abrupt onset of signs of left-sided HF (eg, crackles on auscultation of the lungs) may occur without evidence of right-sided HF (eg, no jugular venous distention [JVD], no dependent edema).
- Chest x-ray reveals increased interstitial markings.
- Pulse oximetry to assess ABG levels.

Medical Management

Goals of medical management are to reduce volume overload, improve ventricular function, and increase respiratory exchange using a combination of oxygen and medication therapies.

Oxygenation

- Oxygen in concentrations adequate to relieve hypoxia and dyspnea
- Oxygen by intermittent or continuous positive pressure, if signs of hypoxemia persist
- Endotracheal intubation and mechanical ventilation, if respiratory failure occurs
- Positive end-expiratory pressure (PEEP)
- Monitoring of pulse oximetry and ABGs

Pharmacologic Therapy

- Morphine given intravenously in small doses to reduce anxiety and dyspnea; contraindicated in cerebral vascular accident, chronic pulmonary disease, or cardiogenic shock; have naloxone hydrochloride (Narcan) available for excessive respiratory depression
- Diuretics (eg, furosemide) to produce a rapid diuretic effect
- Vasodilators such as IV nitroglycerin or nitroprusside (Nipride) may enhance symptom relief

Nursing Management

- Assist with administration of oxygen and intubation and mechanical ventilation.
- Position patient upright (in bed if necessary) or with legs and feet down to promote circulation. Preferably position patient with legs dangling over the side of bed.

- Provide psychological support by reassuring patient. Use touch to convey a sense of concrete reality. Maximize time at the bedside.
- Give frequent, simple, concise information about what is being done to treat the condition and what the responses to treatment mean.
- Monitor effects of medications. Observe patient for excessive respiratory depression, hypotension, and vomiting. Keep a morphine antagonist available (eg, naloxone hydrochloride). Insert and maintain an indwelling catheter if ordered or provide bedside commode.
- The patient receiving continuous IV infusions of vasoactive medications requires ECG monitoring and frequent measurement of vital signs.

For more information, see Chapters 23 and 30 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Pulmonary Embolism

P

PE refers to the obstruction of the pulmonary artery or one of its branches by a thrombus (or thrombi) that originates somewhere in the venous system or in the right side of the heart. Gas exchange is impaired in the lung mass supplied by the obstructed vessel. Massive PE is a life-threatening emergency; death commonly occurs within 1 hour after the onset of symptoms. It is a common disorder associated with trauma, surgery (orthopedic, major abdominal, pelvic, gynecologic), pregnancy, HF, age more than 50 years, hypercoagulable states, and prolonged immobility. It also may occur in apparently healthy people. Most thrombi originate in the deep veins of the legs.

Clinical Manifestations

Symptoms depend on the size of the thrombus and the area of the pulmonary artery occlusion.

- Dyspnea is the most common symptom. Tachypnea is the most frequent sign.

- Chest pain is common, usually sudden in onset and pleuritic in nature; it can be substernal and may mimic angina pectoris or a myocardial infarction.
- Anxiety, fever, tachycardia, apprehension, cough, diaphoresis, hemoptysis, syncope, shock, and sudden death may occur.
- Clinical picture may mimic that of bronchopneumonia or HF.
- In atypical instances, PE causes few signs and symptoms, whereas in other instances it mimics various other cardiopulmonary disorders.

Assessment and Diagnostic Methods

- Because the symptoms of PE can vary from few to severe, a diagnostic workup is performed to rule out other diseases.
- The initial diagnostic workup may include chest x-ray, ECG, ABG analysis, and ventilation–perfusion scan.
- Pulmonary angiography is considered the best method to diagnose PE; however, it may not be feasible, cost-effective, or easily performed, especially with critically ill patients.
- Spiral CT scan of the lung, D-dimer assay (blood test for evidence of blood clots), and pulmonary arteriogram may be warranted.

Prevention

- Ambulation or leg exercises in patients on bed rest
- Application of sequential compression devices
- Anticoagulant therapy for patients whose hemostasis is adequate and who are undergoing major elective abdominal or thoracic surgery

Medical Management

Immediate objective is to stabilize the cardiopulmonary system.

- Nasal oxygen is administered immediately to relieve hypoxemia, respiratory distress, and central cyanosis.
- IV infusion lines are inserted to establish routes for medications or fluids that will be needed.
- A perfusion scan, hemodynamic measurements, and ABG determinations are performed. Spiral (helical) CT or pulmonary angiography may be performed.

- Hypotension is treated by a slow infusion of dobutamine (Dobutrex), which has a dilating effect on the pulmonary vessels and bronchi, or dopamine (Intropin).
- The ECG is monitored continuously for dysrhythmias and right ventricular failure, which may occur suddenly.
- Digitalis glycosides, IV diuretics, and antiarrhythmic agents are administered when appropriate.
- Blood is drawn for serum electrolytes, complete blood cell count, and hematocrit.
- If clinical assessment and ABG analysis indicate the need, the patient is intubated and placed on a mechanical ventilator.
- If the patient has suffered massive embolism and is hypotensive, an indwelling urinary catheter is inserted to monitor urinary output.
- Small doses of IV morphine or sedatives are administered to relieve patient anxiety, to alleviate chest discomfort, to improve tolerance of the endotracheal tube, and to ease adaptation to the mechanical ventilator.

Anticoagulation Therapy

- Anticoagulant therapy (heparin, warfarin sodium [Coumadin]) has traditionally been the primary method for managing acute DVT and PE (numerous specific options for treatment are available).
- Patients must continue to take some form of anticoagulation for at least 3 to 6 months after the embolic event.
- Major side effects are bleeding anywhere in the body and anaphylactic reaction resulting in shock or death. Other side effects include fever, abnormal liver function, and allergic skin reaction.

Thrombolytic Therapy

- Thrombolytic therapy may include urokinase, streptokinase, and alteplase. It is reserved for PE affecting a significant area and causing hemodynamic instability.
- Bleeding is a significant side effect; nonessential invasive procedures are avoided.

Surgical Management

- A surgical embolectomy is rarely performed but may be indicated if the patient has a massive PE or hemodynamic

instability or if there are contraindications to thrombolytic therapy.

- Transvenous catheter embolectomy with or without insertion of an inferior vena caval filter (eg, Greenfield).

Nursing Management

Minimizing the Risk of PE

The nurse must have a high degree of suspicion for PE in all patients, but particularly in those with conditions predisposing to a slowing of venous return.

Preventing Thrombus Formation

- Encourage early ambulation and active and passive leg exercises.
- Instruct patient to move legs in a “pumping” exercise.
- Advise patient to avoid prolonged sitting, immobility, and constrictive clothing.
- Do not permit dangling of legs and feet in a dependent position.
- Instruct patient to place feet on floor or chair and to avoid crossing legs.
- Do not leave IV catheters in veins for prolonged periods.

Monitoring Anticoagulant and Thrombolytic Therapy

- Advise bed rest, monitor vital signs every 2 hours, and limit invasive procedures.
- Measure international normalized ratio (INR) or activated partial thromboplastin time (PTT) every 3 to 4 hours after thrombolytic infusion is started to confirm activation of fibrinolytic systems.
- Perform only essential ABG studies on upper extremities, with manual compression of puncture site for at least 30 minutes.

Minimizing Chest Pain, Pleuritic

- Place patient in semi-Fowler’s position; turn and reposition frequently.
- Administer analgesics as prescribed for severe pain.

Managing Oxygen Therapy

- Assess the patient frequently for signs of hypoxemia and monitors the pulse oximetry values.

- Assist patient with deep breathing and incentive spirometry.
- Nebulizer therapy or percussion and postural drainage may be necessary for management of secretions.

Alleviating Anxiety

- Encourage patient to express feelings and concerns.
- Answer questions concisely and accurately.
- Explain therapy, and describe how to recognize untoward effects early.

Monitoring for Complications

Be alert for the potential complication of cardiogenic shock or right ventricular failure subsequent to the effect of PE on the cardiovascular system.

Providing Postoperative Nursing Care

- Measure pulmonary arterial pressure and urinary output.
- Assess insertion site of arterial catheter for hematoma formation and infection.
- Maintain blood pressure to ensure perfusion of vital organs.
- Encourage isometric exercises, antiembolism stockings, and walking when permitted out of bed; elevate foot of bed when patient is resting.
- Discourage sitting; hip flexion compresses large veins in the legs.

Promoting Home- and Community-Based Care

Teaching Patients Self-Care

- Before discharge and at follow-up clinic or home visits, teach patient how to prevent recurrence and which signs and symptoms should alert patient to seek medical attention.
- Teach patient to look for bruising and bleeding when taking anticoagulants and to avoid bumping into objects. Advise patient to use a toothbrush with soft bristles to prevent gingival bleeding.
- Instruct patient not to take aspirin (an anticoagulant) or antihistamine drugs while taking warfarin sodium (Coumadin).
- Advise patient to check with physician before taking any medication, including OTC drugs.
- Advise patient to continue wearing antiembolism stockings as long as directed.

- Instruct patient to avoid laxatives, which affect vitamin K absorption (vitamin K promotes coagulation).
- Teach patient to avoid sitting with legs crossed or for prolonged periods.
- Recommend that patient change position regularly when traveling, walk occasionally, and do active exercises of legs and ankles.
- Advise patient to drink plenty of liquids.
- Teach patient to report dark, tarry stools immediately.
- Recommend that patient wear identification stating that he or she is taking anticoagulants.

For more information, see Chapter 23 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Pulmonary Heart Disease (Cor Pulmonale)

Cor pulmonale is a condition in which the right ventricle enlarges (with or without right HF) as a result of diseases that affect the structure or function of the lung or its vasculature. A mean pulmonary artery pressure of 45 mm Hg or more may occur. The most frequent cause is severe COPD. Other causes are conditions that restrict or compromise ventilatory function, leading to hypoxemia or acidosis (eg, deformities of the thoracic cage, massive obesity) and conditions that reduce the pulmonary vascular bed (eg, primary idiopathic pulmonary arterial hypertension, pulmonary embolus). Certain disorders of the nervous system, respiratory muscles, chest wall, and pulmonary arterial tree also may be responsible for cor pulmonale. Prognosis depends on reversing the hypertensive process.

Clinical Manifestations

Symptoms are usually related to the underlying lung disease.

- With right ventricular failure, the patient may develop increasing edema of the feet and legs, distended neck veins, an enlarged palpable liver, pleural effusion, ascites, and heart murmurs.

- Headache, confusion, and somnolence may occur as a result of increased levels of carbon dioxide (hypercapnia).
- Patients often complain of increasing shortness of breath, wheezing, cough, and fatigue.

Medical Management

Objectives of treatment are to improve ventilation and to treat both the underlying lung disease and the manifestations of heart disease.

- Oxygen is given to reduce pulmonary arterial pressure and pulmonary vascular resistance. Continuous (24-h/day) oxygen therapy is provided for severe hypoxia.
- Blood oxygen levels are assessed with pulse oximetry and ABG analysis.
- Chest physical therapy and bronchial hygiene maneuvers as indicated to remove accumulated secretions and the administration of bronchodilators further improve ventilation.
- If respiratory failure occurs, intubation and mechanical ventilation may be necessary.
- If HF occurs, hypoxemia and hypercapnia must be relieved to improve cardiac output.
- Peripheral edema and circulatory load on the right side of the heart are reduced with bed rest, sodium restriction, and diuretics.
- If indicated (eg, in left ventricular failure), digitalis may be given.
- The ECG is monitored.
- Pulmonary infection must be treated promptly (it will exacerbate hypoxemia and cor pulmonale).

Nursing Management

See “Nursing Management” of “Heart Failure” for additional information.

- If required, assist with intubation and mechanical ventilation. Support patient physically and emotionally.
- Assess respiratory and cardiac status and administers medications as prescribed.
- Instruct patient about the importance of close monitoring and adherence to the therapeutic regimen, especially oxygen.

- Explore and address factors that affect the patient's adherence to the treatment regimen.
- Advise patient and family that management is long-term and that most care and monitoring will be performed at home for this chronic disorder.
- Administer continuous oxygen and instruct how to use.
- Counsel patient about nutrition if a sodium-restricted diet or a diuretic medication is part of treatment.
- Urge patient to stop smoking, if appropriate; refer patient to smoking cessation or community support group.
- If patient's physical condition warrants close assessment or if patient cannot manage self-care, refer the patient for home care.

For more information, see Chapter 23 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Pulmonary Arterial Hypertension

Pulmonary arterial hypertension is a condition that is not clinically evident until late in the disease. Pulmonary arterial hypertension exists when the mean pulmonary artery pressure exceeds 25 mm Hg with a pulmonary capillary wedge pressure of less than 15 mm Hg. There are two forms: idiopathic (or primary) pulmonary arterial hypertension and pulmonary arterial hypertension due to a known cause. Primary pulmonary hypertension occurs most often in women aged 20 to 40 years, either sporadically or in patients with a family history, and is usually fatal within 5 years of diagnosis. There are several possible causes, but the exact cause is unknown. The clinical presentation may occur with no evidence of pulmonary or cardiac disease. Secondary pulmonary hypertension is more common and results from existing cardiac or pulmonary disease. The prognosis depends on the severity of the underlying disorder and the changes in the pulmonary vascular bed. A common cause of pulmonary arterial hypertension is pulmonary artery constriction due to hypoxemia from COPD (cor pulmonale), which is discussed below.

Pathophysiology

When the pulmonary vascular bed is destroyed or obstructed, its ability to handle the blood volume received is impaired. The increased blood flow increases the pulmonary artery pressure and pulmonary vascular resistance and pressure (hypertension).

Clinical Manifestations

- Dyspnea, the main symptom, is noticed first with exertion and then at rest.
- Substernal chest pain is common.
- Weakness, fatigability, syncope, and occasional hemoptysis may occur.
- Signs of right-sided HF (peripheral edema, ascites, distended neck veins, liver engorgement, crackles, heart murmur) are noted.
- Anorexia and abdominal pain in the right upper quadrant may also occur.
- PaO_2 is decreased (hypoxemia).
- ECG changes (right ventricular hypertrophy) are seen, with right axis deviation and tall, peaked P waves in inferior leads and tall anterior R waves and ST-segment depression or T-wave inversion anteriorly.

Assessment and Diagnostic Methods

Complete diagnostic evaluation includes a history, physical examination, chest x-ray, pulmonary function studies, ECG, echocardiogram, ventilation–perfusion scan, sleep studies, autoantibody tests (to identify diseases of collagen vascular origin), HIV tests, liver function testing, and cardiac catheterization.

Medical Management

The goal of treatment is to manage the underlying condition related to pulmonary hypertension of known cause. Most patients with pulmonary hypertension do not have hypoxemia at rest but require supplemental oxygen with exercise.

- Anticoagulation should be considered for patients with pulmonary hypertension and patients with an indwelling catheter for administration of medications.

- Different classes of medications are used to treat pulmonary hypertension; these include calcium channel blockers, phosphodiesterase-5 inhibitors (eg, sildenafil [Revatio, Viagra]), endothelin antagonists (eg, bosentan [Tracleer]), and prostanoids (eg, epoprostenol [Flolan], treprostinil [Remodulin], and iloprost [Ventavis]). The choice of therapeutic agents is based on the severity of the disease.
- A small number of patients with pulmonary hypertension respond favorably to acute vasodilation and do well with a calcium channel blocking agent.
- Lung transplantation remains an option for all eligible patients who have severe disease and symptoms after 3 months of receiving epoprostenol; atrial septostomy may be considered for selected patients.

Nursing Management

- Identify patients at high risk for developing pulmonary hypertension (ie, those with COPD, pulmonary emboli, congenital heart disease, and mitral valve disease).
- Be alert for signs and symptoms.
- Administer prescribed oxygen therapy appropriately.
- Inform and instruct patient and family about home oxygen supplementation.

For more information, see Chapter 23 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Pyelonephritis, Acute

Pyelonephritis, an upper UTI, is a bacterial infection of the renal pelvis, tubules, and interstitial tissue of one or both kidneys. Causes involve either the upward spread of bacteria from the bladder or spread from systemic sources reaching the kidney via the bloodstream. An incompetent ureterovesical valve or obstruction occurring in the urinary tract increases the susceptibility of the kidneys to infection. Bladder tumors, strictures, benign prostatic hyperplasia, and urinary stones are some potential causes of obstruction that can lead to infections. Pyelonephritis may be acute or chronic.

Clinical Manifestations

- Chills, fever, leukocytosis, bacteriuria, and pyuria.
- Low back pain, flank pain, nausea and vomiting, headache, malaise, and painful urination are common findings.
- Pain and tenderness in the area of the costovertebral angle.
- Symptoms of lower urinary tract involvement, such as urgency and frequency, are common.

Assessment and Diagnostic Methods

- Ultrasound or CT scan.
- An IV pyelogram may be indicated with pyelonephritis if functional and structural renal abnormalities are suspected.
- Urine culture and sensitivity tests.
- Radionuclide imaging with gallium if other studies not conclusive.

Medical Management

- For outpatients, a 2-week course of antibiotics is recommended; commonly prescribed agents include some of the same medications prescribed for the treatment of UTIs.
- Pregnant women may be hospitalized for 2 or 3 days of parenteral antibiotic therapy. Oral antibiotic agents may be prescribed once the patient is afebrile and showing clinical improvement.
- After the initial antibiotic regimen, the patient may need antibiotic therapy for up to 6 weeks if a relapse occurs. A follow-up urine culture is obtained 2 weeks after completion of antibiotic therapy to document clearing of the infection.
- Hydration with oral or parenteral fluids is essential in all patients with UTIs when there is adequate kidney function.

Nursing Management

The plan of care is the same as that for upper UTIs.

For more information, see Chapter 45 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Pyelonephritis, Chronic

Repeated bouts of acute pyelonephritis may lead to chronic pyelonephritis. Complications of chronic pyelonephritis include

end-stage renal disease (from progressive loss of nephrons secondary to chronic inflammation and scarring), hypertension, and formation of kidney stones (from chronic infection with urea-splitting organisms).

Clinical Manifestations

- Patient usually has no symptoms of infection unless an acute exacerbation occurs.
- Fatigue, headache, and poor appetite may occur.
- Polyuria, excessive thirst, and weight loss may result.
- Persistent and recurring infection may produce progressive scarring resulting in renal failure.

Assessment and Diagnostic Methods

- IV urography
- Measurement of blood urea nitrogen (BUN), creatinine levels, and creatinine clearance

Medical Management

Long-term use of prophylactic antimicrobial therapy may help limit recurrence of infections and renal scarring. Impaired renal function alters the excretion of antimicrobial agents and necessitates careful monitoring of renal function, especially if the medications are potentially toxic to the kidneys.

P

Nursing Management

The plan of care is the same as that for upper UTIs.

- If patient is hospitalized, encourage fluids (3 to 4 L/day) unless contraindicated.
- Monitor and record intake and output.
- Assess body temperature every 4 hours and administers antipyretic and antibiotic agents as prescribed.
- Teach preventive measures and early recognition of symptoms.
- Stress the importance of taking antimicrobial medications exactly as prescribed, along with the need for keeping follow-up appointments.

For more information, see Chapter 45 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.



R

Raynaud's Phenomenon

Raynaud's phenomenon is a form of intermittent arteriolar vasoconstriction that results in coldness, pain, and pallor of the fingertips or toes. Primary or idiopathic Raynaud's (Raynaud's disease) occurs in the absence of an underlying disease. Secondary Raynaud's (Raynaud's syndrome) occurs in association with an underlying disease, usually a connective tissue disorder, such as systemic lupus erythematosus, rheumatoid arthritis, scleroderma; trauma; or obstructive arterial lesions. Raynaud's phenomenon is most common in women between 16 and 40 years of age, and it occurs more frequently in cold climates and during the winter.

The prognosis for patients with Raynaud's phenomenon varies; some slowly improve, some become progressively worse, and others show no change. Raynaud's symptoms may be mild so that treatment is not required. However, secondary Raynaud's is characterized by vasospasm and fixed blood vessel obstructions that may lead to ischemia, ulceration, and gangrene.

Clinical Manifestations

- Pallor brought on by sudden vasoconstriction followed by cyanosis followed by hyperemia (exaggerated reflow) due to vasodilation with a resultant red color (rubor); the progression follows the characteristic color change white, blue, red.
- Numbness, tingling, and burning pain occur as color changes.
- Involvement tends to be bilateral and symmetric and may involve toes and fingers.

Medical Management

Avoiding the particular stimuli (eg, cold, tobacco) that provoke vasoconstriction is a primary factor in controlling Raynaud's phenomenon. Calcium channel blockers (nifedipine [Procardia], amlodipine [Norvasc]) may be effective in

relieving symptoms. Sympathectomy (interrupting the sympathetic nerves by removing the sympathetic ganglia or dividing their branches) may help some patients.

Nursing Management

- Instruct patient to avoid situations that may be stressful or unsafe.
- Advise patient to minimize exposure to cold, remain indoors as much as possible, and wear protective clothing when outdoors during cold weather.
- Reassure patient that serious complications (gangrene and amputation) are not usual.
- Emphasize the importance of avoiding nicotine (smoking cessation without use of nicotine patches); assist in finding support group.
- Advise patient to handle sharp objects carefully to avoid injuring the fingers.
- Inform patient about postural hypotension that may result from medications.

For more information, see Chapter 31 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Regional Enteritis (Crohn's Disease)

Regional enteritis is a subacute and chronic inflammation of the gastrointestinal (GI) tract wall that extends through all layers. Crohn's disease is usually first diagnosed in adolescents or young adults but can appear at any time of life. Although the most common areas in which it is found are the distal ileum and colon, it can occur anywhere along the GI tract. Fistulas, fissures, and abscesses form as the inflammation extends into the peritoneum. In advanced cases, the intestinal mucosa has a cobblestonelike appearance. As the disease advances, the bowel wall thickens and becomes fibrotic and the intestinal lumen narrows. The clinical course and symptoms vary. In some patients, periods of remission and exacerbation occur, but in others, the disease follows a fulminating course.

Clinical Manifestations

- Onset of symptoms is usually insidious, with prominent right lower quadrant abdominal pain and diarrhea unrelieved by defecation.
- Abdominal tenderness and spasm.
- Crampy pains occur after meals; the patient tends to limit intake, causing weight loss, malnutrition, and secondary anemia.
- Chronic diarrhea may occur, resulting in a patient who is uncomfortable and is thin and emaciated from inadequate food intake and constant fluid loss. The inflamed intestine may perforate and form intra-abdominal and anal abscesses.
- Fever and leukocytosis occur.
- Abscesses, fistulas, and fissures are common.
- Symptoms extend beyond the GI tract to include joint disorders (eg, arthritis), skin lesions (eg, erythema nodosum), ocular disorders (eg, conjunctivitis), and oral ulcers.

Assessment and Diagnostic Methods

- Barium study of the upper GI tract is the most conclusive diagnostic aid; shows the classic "string sign" of the terminal ileum (constriction of a segment of intestine) as well as cobblestone appearance, fistulas, and fissures.
- Endoscopy, colonoscopy, and intestinal biopsies may be used to confirm the diagnosis.
- Proctosigmoidoscopic examination, computed tomography (CT) scan.
- Stool examination for occult blood and steatorrhea.
- Complete blood cell count (decreased Hgb and Hct), sedimentation rate (elevated), albumin, and protein levels (usually decreased due to malnutrition).

Medical Management

See "Medical Management" under "Ulcerative Colitis" for additional information.

Nursing Management

See "Nursing Process: The Patient with Inflammatory Bowel Disease" under "Ulcerative Colitis" for additional information.

For more information, see Chapter 38 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Renal Failure, Acute

Renal failure results when the kidneys are unable to remove metabolic waste and perform their regulatory functions. Acute renal failure (ARF) is a rapid loss of renal function due to damage to the kidneys. Three major categories of ARF are prerenal (hypoperfusion, as from volume depletion disorders, extreme vasodilation, or impaired cardiac performance); intrarenal (parenchymal damage to the glomeruli or kidney tubules, as from burns, crush injuries, infections, transfusion reaction, or nephrotoxicity, which may lead to acute tubular necrosis [ATN]); and postrenal (urinary tract obstruction, as from calculi, tumor, strictures, prostatic hyperplasia, or blood clots).

Clinical Stages

- Initiation period: initial insult and oliguria.
- Oliguric period (urine volume less than 400 mL/day): Uremic symptoms first appear and hyperkalemia may develop.
- Diuresis period: gradual increase in urine output signaling beginning of glomerular filtration's recovery. Laboratory values stabilize and start to decrease.
- Recovery period: improving renal function (may take 3 to 12 months).

R

Clinical Manifestations

- Critical illness and lethargy with persistent nausea, vomiting, and diarrhea.
- Skin and mucous membranes are dry.
- Central nervous system manifestations: drowsiness, headache, muscle twitching, seizures.
- Urine output scanty to normal; urine may be bloody with low specific gravity.
- Steady rise in blood urea nitrogen (BUN) may occur depending on degree of catabolism; serum creatinine values increase with disease progression.

- Hyperkalemia may lead to dysrhythmias and cardiac arrest.
- Progressive acidosis, increase in serum phosphate concentrations, and low serum calcium levels may be noted.
- Anemia from blood loss due to uremic GI lesions, reduced red blood cell life-span, and reduced erythropoietin production.

Assessment and Diagnostic Methods

- Urine output measurements
- Renal ultrasonography, CT and magnetic resonance imaging (MRI) scans
- BUN, creatinine, electrolyte analyses

Gerontologic Considerations

About half of all patients who develop ARF during hospitalization are older than 60 years. The etiology of ARF in older adults includes prerenal causes, such as dehydration, intrarenal causes such as nephrotoxic agents (eg, medications, contrast agents), and complications of major surgery. Suppression of thirst, enforced bed rest, lack of access to drinking water, and confusion all contribute to the older patient's failure to consume adequate fluids, and may lead to dehydration further compromising already decreased renal function.

ARF in the elderly is also often seen in the community setting. Nurses in the ambulatory setting need to be aware of the risk. All medications need to be monitored for potential side effects that could result in damage to the kidney either through reduced circulation or nephrotoxicity. Outpatient procedures that require fasting or a bowel preparation may cause dehydration and therefore require careful monitoring.

Medical Management

Treatment objectives are to restore normal chemical balance and prevent complications until renal tissues are repaired and renal function is restored. Possible causes of damage are identified and treated.

- Fluid balance is managed on the basis of daily weight, serial measurements of central venous pressure, serum and urine concentrations, fluid losses, blood pressure, and clinical status. Fluid excesses are treated with mannitol,

furosemide, or ethacrynic acid to initiate diuresis and prevent or minimize subsequent renal failure.
- Blood flow is restored to the kidneys with the use of intravenous (IV) fluids, albumin, or blood product transfusions.
- Dialysis (hemodialysis, hemofiltration, or peritoneal dialysis) is started to prevent complications, including hyperkalemia, metabolic acidosis, pericarditis, and pulmonary edema.
- Cation-exchange resins (orally or by retention enema).
- IV dextrose 50%, insulin, and calcium replacement for the patient who is hemodynamically unstable (low blood pressure, changes in mental status, dysrhythmia).
- Shock and infection are treated if present.
- Arterial blood gases are monitored when severe acidosis is present.
- Sodium bicarbonate to elevate plasma pH.
- If respiratory problems develop, ventilatory measures are started.
- Phosphate-binding agents to control elevated serum phosphate concentrations.
- Replacement of dietary proteins is individualized to provide the maximum benefit and minimize uremic symptoms.
- Caloric requirements are met with high-carbohydrate feedings; parenteral nutrition (PN).
- Foods and fluids containing potassium and phosphorus are restricted.
- Blood chemistries are evaluated to determine amount of sodium, potassium, and water replacement during oliguric phase.
- After the diuretic phase, high-protein, high-calorie diet is given with gradual resumption of activities.

Nursing Management

- Monitor for complications.
- Assist in emergency treatment of fluid and electrolyte imbalances.
- Assess progress and response to treatment; provide physical and emotional support.
- Keep family informed about condition and provide support.

Monitoring Fluid and Electrolyte Balance

- Screen parenteral fluids, all oral intake, and all medications for hidden sources of potassium.
- Monitor cardiac function and musculoskeletal status for signs of hyperkalemia.
- Pay careful attention to fluid intake (IV medications should be administered in the smallest volume possible), urine output, apparent edema, distention of the jugular veins, alterations in heart sounds and breath sounds, and increasing difficulty in breathing.
- Maintain daily weight and intake and output records.
- Report indicators of deteriorating fluid and electrolyte status immediately. Prepare for emergency treatment of hyperkalemia. Prepare patient for dialysis as indicated to correct fluid and electrolyte imbalances.

Reducing Metabolic Rate

- Reduce exertion and metabolic rate during most acute stage with bed rest.
- Prevent or treat fever and infection promptly.

Promoting Pulmonary Function

- Assist patient to turn, cough, and take deep breaths frequently.
- Encourage and assist patient to move and turn.

Preventing Infection

- Practice asepsis when working with invasive lines and catheters.
- Avoid using an indwelling catheter if possible.

Providing Skin Care

- Perform meticulous skin care.
- Bath the patient with cool water, turn patient frequently, keep the skin clean and well moisturized and fingernails trimmed for patient comfort and to prevent skin breakdown.

Providing Psychosocial Support

- Assist, explain, and support patient and family during hemodialysis treatment; do not overlook psychological needs and concerns.
- Explain rationale of treatment to patient and family. Repeat explanations and clarify answers as needed.

- Encourage family to touch and talk to patient during dialysis.
- Continually assess patient for complications and their precipitating causes.

For more information, see Chapter 44 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Renal Failure, Chronic (End-Stage Renal Disease)

When a patient has sustained enough kidney damage to require renal replacement therapy on a permanent basis, the patient has moved into the final stage of chronic kidney disease, also referred to as chronic renal failure (CRF) or end-stage renal disease (ESRD).

The rate of decline in renal function and progression of ESRD is related to the underlying disorder, the urinary excretion of protein, and the presence of hypertension. The disease tends to progress more rapidly in patients who excrete significant amounts of protein or have elevated blood pressure than in those without these conditions.

Clinical Manifestations

- Cardiovascular: hypertension, pitting edema (feet, hands, sacrum), periorbital edema, pericardial friction rub, engorged neck veins, pericarditis, pericardial effusion, pericardial tamponade, hyperkalemia, hyperlipidemia
- Integumentary: gray-bronze skin color, dry flaky skin, severe pruritus, ecchymosis, purpura, thin brittle nails, coarse thinning hair
- Pulmonary: crackles; thick, tenacious sputum; depressed cough reflex; pleuritic pain; shortness of breath; tachypnea; Kussmaul-type respirations; uremic pneumonitis
- GI: ammonia odor to breath, metallic taste, mouth ulcerations and bleeding, anorexia, nausea and vomiting, hiccups, constipation or diarrhea, bleeding from GI tract
- Neurologic: weakness and fatigue, confusion, inability to concentrate, disorientation, tremors, seizures, asterixis, restlessness of legs, burning of soles of feet, behavior changes

- Musculoskeletal: muscle cramps, loss of muscle strength, renal osteodystrophy, bone pain, fractures, foot drop
- Reproductive: amenorrhea, testicular atrophy, infertility, decreased libido
- Hematologic: anemia, thrombocytopenia

Gerontologic Considerations

Diabetes, hypertension, chronic glomerulonephritis, interstitial nephritis, and urinary tract obstruction are the causes of ESRD in the elderly. The symptoms of other disorders (heart failure, dementia) can mask the symptoms of renal disease and delay or prevent diagnosis and treatment. The patient often complains of signs and symptoms of nephrotic syndrome, such as edema and proteinuria. The elderly patient may develop nonspecific signs of disturbed renal function and fluid and electrolyte imbalances. Hemodialysis and peritoneal dialysis have been used effectively in elderly patients. Concomitant disorders have made transplantation a less common treatment for the elderly. Conservative management, including nutritional therapy, fluid control, and medications (such as phosphate binders), may be used if dialysis or transplantation is not suitable.

Medical Management

Goals of management are to retain kidney function and maintain homeostasis for as long as possible. All factors that contribute to ESRD and those that are reversible (eg, obstruction) are identified and treated.

Pharmacologic Management

Complications can be prevented or delayed by administering prescribed phosphate-binding agents, calcium supplements, antihypertensive and cardiac medications, antiseizure medications, and erythropoietin (Epogen).

- Hyperphosphatemia and hypocalcemia are treated with medications that bind dietary phosphorus in the GI tract (eg, calcium carbonate, calcium acetate, sevelamer hydrochloride); all binding agents must be administered with food.
- Hypertension is managed by intravascular volume control and antihypertensive medication.

- Heart failure and pulmonary edema are treated with fluid restriction, low-sodium diet, diuretics, inotropic agents (eg, digoxin or dobutamine), and dialysis.
- Metabolic acidosis is treated, if necessary, with sodium bicarbonate supplements or dialysis.
- Patient is observed for early evidence of neurologic abnormalities (eg, slight twitching, headache, delirium, or seizure activity); IV diazepam (Valium) or phenytoin (Dilantin) is administered to control seizures.
- Anemia is treated with recombinant human erythropoietin (Epogen); hemoglobin and hematocrit are monitored frequently.
- Heparin is adjusted as necessary to prevent clotting of dialysis lines during treatments.
- Supplementary iron may be prescribed.
- Blood pressure and serum potassium levels are monitored.

Nutritional Therapy

- Dietary intervention is needed, with careful regulation of protein intake, fluid intake to balance fluid losses, and sodium intake, and with some restriction of potassium.
- Adequate intake of calories and vitamins is ensured. Calories are supplied with carbohydrates and fats to prevent wasting.
- Protein is restricted; allowed protein must be of high biologic value (dairy products, eggs, meats).
- Fluid allowance is 500 to 600 mL of fluid or more than the previous day's 24-hour urine output.
- Vitamin supplementation.

Dialysis

The patient with increasing symptoms of renal failure is referred to a dialysis and transplantation center early in the course of progressive renal disease. Dialysis is usually initiated when the patient cannot maintain a reasonable lifestyle with conservative treatment.

Nursing Management

- Assess fluid status and identify potential sources of imbalance.
- Implement a dietary program to ensure proper nutritional intake within the limits of the treatment regimen.

- Promote positive feelings by encouraging increased self-care and greater independence.
- Provide explanations and information to the patient and family concerning ESRD, treatment options, and potential complications.
- Provide emotional support.

Promoting Home- and Community-Based Care

Teaching Patients Self-Care

- Provide ongoing explanations and information to patient and family concerning ESRD, treatment options, and potential complications; monitor the patient's progress and compliance with the treatment regimen.
- Refer patient for dietary counseling and assist with nutritional planning.
- Teach patient how to check the vascular access device for patency and appropriate precautions, such as avoiding venipuncture and blood pressure measurements on the arm with the access device.
- Teach patient and family what problems to report: signs of worsening renal failure, hyperkalemia, access problems.

Continuing Care

- Stress the importance of follow-up examinations and treatment.
- Refer patient to home care nurse for continued monitoring and support.
- Reinforce the dietary restrictions required, including fluid, sodium, potassium, and protein restriction.
- Remind the patient about the need for health promotion activities and health screening.

For more information, see Chapter 44 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.



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Seborrheic Dermatoses

Seborrhea is an excessive production of sebum (secretion of sebaceous glands). Seborrheic dermatitis is a chronic inflammatory disease of the skin with a predilection for areas that are well supplied with sebaceous glands or that lie between folds of the skin, where the bacterial count is high. Seborrheic dermatitis has a genetic predisposition; hormones, nutritional status, infection, and emotional stress influence its course. There are remissions and exacerbations of this condition. Areas most often affected are the face, scalp, cheeks, ears, axillae, and various skin folds.

Clinical Manifestations

Two forms can occur: an oily form and a dry form. Either form may start in childhood with fine scaling of the scalp or other areas.

Oily Form

Moist or greasy patches of sallow, greasy-appearing skin, with or without scaling, and slight erythema (redness); small pustules or papulopustules on trunk resembling acne.

Dry Form

Flaky desquamation of the scalp (dandruff); asymptomatic mild forms or scaling often accompanied by pruritus, leading to scratching and secondary infections and excoriation.

Medical Management

Because there is no known cure for seborrhea, the objectives of therapy are to control the disorder and allow the skin to repair itself. Treatment measures include the following:

- Administering topical corticosteroid cream to body and face (use with caution near eyes).

- Aerating skin and careful cleansing of creases or folds to prevent candidal yeast infection (evaluate patients with persistent candidiasis for diabetes).
- Shampooing hair daily or at least three times weekly with medicated shampoos. Two or three different types of shampoos are used in rotation to prevent the seborrhea from becoming resistant to a particular shampoo.

Nursing Management

- Advise patient to avoid external irritants, excess heat, and perspiration; rubbing and scratching prolong the disorder.
- Instruct patient to avoid secondary infections by airing the skin and keeping skin folds clean and dry.
- Reinforce instructions for using medicated shampoos; frequent shampooing is contrary to some cultural practices—be sensitive to these differences when teaching the patient about home care.
- Caution patient that seborrheic dermatitis is a chronic problem that tends to reappear. The goal is to keep it under control.
- Encourage patient to adhere to treatment program.
- Treat patients with sensitivity and an awareness of their need to express their feelings when they become discouraged by the disorder's effect on body image.

For more information, see Chapter 56 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Shock, Cardiogenic

Cardiogenic shock occurs when the heart's ability to contract and to pump blood is impaired and the supply of oxygen is inadequate for the heart and tissues. The causes of cardiogenic shock are known as either coronary or noncoronary. Coronary cardiogenic shock is more common than noncoronary cardiogenic shock and is seen most often in patients with acute myocardial infarction. Noncoronary causes of cardiogenic shock are related to conditions that stress the myocardium

(eg, severe hypoxemia, acidosis, hypoglycemia, hypocalcemia, and tension pneumothorax) and conditions that result in ineffective myocardial function (eg, cardiomyopathies, valvular damage, cardiac tamponade, dysrhythmias).

Clinical Manifestations

- Classic signs include low blood pressure (BP), rapid and weak pulse.
- Dysrhythmias are common.
- Angina pain may be experienced.
- Hemodynamic instability.
- Complaints of fatigue.

Medical Management

Goals of medical treatment include limiting further myocardial damage, preserving the healthy myocardium, and improving cardiac function. It is necessary first to treat the oxygenation needs of the heart muscle, increasing oxygen supply to the heart muscle while reducing oxygen demands.

- First-line treatment includes administering supplemental oxygen, controlling chest pain, administering fluids, and administering vasoactive medications (eg, dobutamine, nitroglycerin, dopamine) and antiarrhythmic medications.
- Hemodynamic monitoring and laboratory marker monitoring are performed.
- Mechanical cardiac support may be necessary.
- Coronary cardiogenic shock may be treated with thrombolytic therapy, a percutaneous coronary intervention, coronary artery bypass graft surgery, and/or intra-aortic balloon pump therapy.
- Noncoronary cardiogenic shock may be treated with cardiac valve replacement, correction of dysrhythmia, correction of acidosis and electrolyte disturbances, or treatment of the tension pneumothorax.

Nursing Management

Prevention

- Early on, identify patients at risk for cardiogenic shock.
- Promote adequate oxygenation of the heart muscle, and decrease cardiac workload (eg, conserve energy, relieve pain, administer oxygen).

Hemodynamic Monitoring

- Monitor hemodynamic and cardiac status: maintain arterial lines and electrocardiogram (ECG) equipment.
- Anticipate need for medications, intravenous (IV) fluids, and other equipment.
- Document and promptly report changes in hemodynamic, cardiac, and pulmonary status.

Medication and Fluid Administration

- Provide for safe and accurate administration of IV fluids and medications.
- Monitor for desired effects and side effects (eg, decreased BP after administering morphine or nitroglycerin, bleeding at arterial and venous puncture sites).
- Monitor urine output, blood urea nitrogen, and serum creatinine levels to detect any decrease in renal function.

Intra-Aortic Balloon Counterpulsation

- Provide ongoing timing adjustments of the balloon pump for maximum effectiveness.
- Perform frequent checks of neurovascular status of lower extremities.

Safety and Comfort

Take an active role in ensuring patient's safety and comfort and in reducing anxiety.

For more information, see Chapter 15 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Shock, Hypovolemic

Hypovolemic shock, the most common type of shock, is characterized by decreased intravascular volume. Hypovolemic shock can be caused by external fluid losses, as in traumatic blood loss, or by internal fluid shifts, as in severe dehydration, severe edema, or ascites. Decreased blood volume results in decreased venous return and subsequent decreased ventricular filling, decreased stroke volume and cardiac output, and decreased tissue perfusion.

Clinical Manifestations

- Fall in venous pressure, rise in peripheral resistance, tachycardia
- Cold, moist skin; pallor; thirst; diaphoresis
- Altered sensorium, oliguria, metabolic acidosis, tachypnea
- Most dependable criterion: level of arterial BP

Medical Management

Goals of treatment are to restore intravascular volume, redistribute fluid volume, and correct the underlying cause. If the patient is hemorrhaging, bleeding is stopped by applying pressure or by surgery. Diarrhea and vomiting are treated with medications.

Fluid and Blood Replacement

- At least two IV lines are inserted to administer fluid, medications, and/or blood.
- Lactated Ringer's solution, colloids, or 0.9% sodium chloride solution (normal saline) are administered to restore intravascular volume.
- Blood products are used only if other alternatives are unavailable or blood loss is extensive and rapid.

Redistribution of Fluids

Positioning the patient properly assists fluid redistribution—a modified. Trendelenburg position is recommended in hypovolemic shock. Elevation of the legs promotes the return of venous blood.

Pharmacologic Therapy

If fluid administration fails to reverse hypovolemic shock, then vasoactive medications that prevent cardiac failure are given. Medications are also administered to reverse the cause of the dehydration.

Nursing Management

- Closely monitor patients at risk for fluid deficits (younger than 1 year or older than 65 years).
- Assist with fluid replacement before intravascular volume is depleted.
- Ensure safe administration of prescribed fluids and medications, and document effects.

- Monitor and promptly report signs of complications and effects of treatment. Monitor patient closely for adverse effects.
- Monitor for cardiovascular overload, signs of difficulty breathing, and pulmonary edema: hemodynamic pressure, vital signs, arterial blood gases, serum lactate levels, hemoglobin and hematocrit levels, and fluid intake and output.
- Reduce fear and anxiety about the need for an oxygen mask by giving patient explanations and frequent reassurance.

For more information, see Chapter 15 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Shock, Septic

Septic shock, the most common type of circulatory shock, is caused by widespread infection. Gram-negative bacteria are the most common pathogens. Other infectious agents, such as Gram-positive bacteria (increasingly) and viruses and fungi, can also cause septic shock.

Risk Factors

Risk factors for septic shock include the increased use of invasive procedures and indwelling medical devices; the increased number of antibiotic-resistant microorganisms; and the increasingly older population. Other patients at risk are those with malnutrition or immunosuppression and those with chronic illness (eg, diabetes mellitus, hepatitis).

Pathophysiology

Microorganism invasion causes an immune response. This immune response activates biochemical cytokines and mediators associated with an inflammatory response and produces a variety of effects leading to shock. The resulting increased capillary permeability, with fluid loss from the capillaries and vasodilation, results in inadequate perfusion of oxygen and nutrients to the tissues and cells.

Clinical Manifestations

In the early stage of septic shock

- BP may remain within normal limits (or hypotensive but responsive to fluids).
- Heart and respiratory rates elevated.
- High cardiac output with vasodilation.
- Hyperthermia (febrile) with warm, flushed skin, bounding pulses.
- Urinary output normal or decreased.
- Gastrointestinal status compromised (eg, nausea, vomiting, diarrhea, or decreased bowel sounds).
- Subtle changes in mental status.

As sepsis progresses

- Low cardiac output with vasoconstriction
- BP drops
- Skin cool and pale
- Temperature normal or below normal
- Heart and respiratory rates rapid
- Anuria and multiple organ dysfunction progressing to failure

Gerontologic Considerations

Septic shock may be manifested by atypical or confusing clinical signs. Suspect septic shock in any elderly person who develops an unexplained acute confused state, tachypnea, or hypotension.

Medical Management

- Blood, sputum, urine, and wound drainage specimens are collected to identify and eliminate the cause of infection.
- Potential routes of infection are eliminated (IV lines rerouted if necessary). Abscesses are drained and necrotic areas debrided.
- Fluid replacement is instituted.
- Broad-spectrum antibiotics are started. Recombinant human activated protein C (rhAPC; drotrecogin alfa [Xigris]) administered to patients with end-organ dysfunction and high risk of death.
- Aggressive nutritional supplementation (high protein) is provided. Enteral feedings are preferred.

Nursing Management

- Identify patients at risk for sepsis and septic shock.
- Carry out all invasive procedures with correct aseptic technique after careful hand hygiene.
- Monitor IV lines, arterial and venous puncture sites, surgical incisions, trauma wounds, urinary catheters, and pressure ulcers for signs of infection.
- Reduce patient's temperature when ordered for temperatures higher than 40°C (104°F) or if the patient is uncomfortable by administering acetaminophen or applying a hypothermia blanket; monitor closely for shivering.
- Administer prescribed IV fluids and medications.
- Monitor and report blood levels (antibiotic, blood urea nitrogen, and creatinine levels; white blood cell count; hemoglobin and hematocrit levels; platelet count; coagulation studies).
- Monitor hemodynamic status, fluid intake and output, and nutritional status.
- Monitor daily weights and serum albumin and prealbumin levels to determine daily protein requirements.

For more information, see Chapter 15 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Spinal Cord Injury

Spinal cord injuries (SCIs) are a major health problem. Most SCIs result from motor vehicle crashes. Other causes include falls, violence (primarily from gunshot wounds), and recreational sporting activities. Half of the victims are between 16 and 30 years of age; most are males. Another risk factor is substance abuse (alcohol and drugs). There is a high frequency of associated injuries and medical complications. The vertebrae most frequently involved in SCIs are the fifth, sixth, and seventh cervical vertebrae (C5–C7), the 12th thoracic vertebra (T12), and the first lumbar vertebra (L1). These vertebrae are the most susceptible because there is a greater range of mobility in the vertebral column in these areas. Damage to

the spinal cord ranges from transient concussion (patient recovers fully), to contusion, laceration, and compression of the cord substance (either alone or in combination), to complete transection of the cord (paralysis below the level of injury). Injury can be categorized as primary (usually permanent) or secondary (nerve fibers swell and disintegrate as a result of ischemia, hypoxia, edema, and hemorrhagic lesions). Whereas a primary injury is permanent, a secondary injury may be reversible if treated within 4 to 6 hours of the initial injury. The type of injury refers to the extent of injury to the spinal cord itself.

Incomplete spinal cord lesions are classified according to the area of spinal cord damage: central, lateral, anterior, or peripheral. A complete SCI can result in paraplegia (paralysis of the lower body) or tetraplegia (formerly quadriplegia—paralysis of all four extremities).

Clinical Manifestations

The consequences of SCI depend on the type and level of injury of the cord.

Neurologic Level

The neurologic level refers to the lowest level at which sensory and motor functions are normal. Signs and symptoms include the following:

- Total sensory and motor paralysis below the neurologic level.
- Loss of bladder and bowel control (usually with urinary retention and bladder distention).
- Loss of sweating and vasomotor tone.
- Marked reduction of BP from loss of peripheral vascular resistance.
- If conscious, patient reports acute pain in back or neck; patient may speak of fear that the neck or back is broken.

Respiratory Problems

- Related to compromised respiratory function; severity depends on level of injury.
- Acute respiratory failure is the leading cause of death in high cervical cord injury.

Assessment and Diagnostic Methods

Detailed neurologic examination, x-ray examinations (lateral cervical spine x-rays), computed tomography (CT), magnetic resonance imaging (MRI), and ECG (bradycardia and asystole are common in acute spinal injuries) are common assessment and diagnostic methods.

Complications

Spinal shock, a serious complication of SCI, is a sudden depression of reflex activity in the spinal cord (areflexia) below the level of injury. The muscles innervated by the part of the cord segment situated below the level of the lesion become completely paralyzed and flaccid, and the reflexes are absent. BP and heart rate fall as vital organs are affected. Parts of the body below the level of the cord lesion are paralyzed and without sensation.

Emergency Management

- Immediate patient management at the accident scene is crucial. Improper handling can cause further damage and loss of neurologic function.
- Consider any victim of a motor vehicle crash, a diving or contact sports injury, a fall, or any direct trauma to the head and neck as having an SCI until ruled out.
- Initial care includes rapid assessment, immobilization, extrication, stabilization or control of life-threatening injuries, and transportation to an appropriate medical facility.
- Maintain patient in an extended position (not sitting); no body part should be twisted or turned.
- The standard of care is referral to a regional spinal injury center or trauma center for treatment in first 24 hours.

Medical Management

Acute Phase

Goals of management are to prevent further SCI and to observe for symptoms of progressive neurologic deficits. The patient is resuscitated as necessary, and oxygenation and cardiovascular stability are maintained. High-dose corticosteroids (methylprednisolone) may be administered to counteract spinal cord edema.

Oxygen is administered to maintain a high arterial PaO_2. Extreme care is taken to avoid flexing or extending the neck if endotracheal intubation is necessary. Diaphragm pacing (electrical stimulation of the phrenic nerve) may be considered for patients with high cervical spine injuries.

SCI requires immobilization, reduction of dislocations, and stabilization of the vertebral column. The cervical fracture is reduced and the cervical spine aligned with a form of skeletal traction (using skeletal tongs or calipers or the halo-vest technique). Weights are hung freely so as not to interfere with the traction.

Early surgery reduces the need for traction. The goals of surgical treatment are to preserve neurologic function by removing pressure from the spinal cord and to provide stability.

Management of Complications

Spinal and Neurogenic Shock

- Intestinal decompression is used to treat bowel distention and paralytic ileus caused by depression of reflexes. This loss of sympathetic innervation causes a variety of other clinical manifestations, including neurogenic shock signaled by decreased cardiac output, venous pooling in the extremities, and peripheral vasodilation.
- Patient who does not perspire on paralyzed portion of body requires close observation for early detection of an abrupt onset of fever.
- Body defenses are maintained and supported until the spinal shock abates and the system has recovered from the traumatic insult (up to 4 months).
- Special attention is paid to the respiratory system (may not be enough intrathoracic pressure to cough effectively). Special problems include decreased vital capacity, decreased oxygen levels, and pulmonary edema.
- Chest physiotherapy and suctioning are implemented to help clear pulmonary secretions. Patient is monitored for respiratory complications (respiratory failure, pneumonia).

Deep Vein Thrombosis and Other Complications

- Patient is observed for deep vein thrombosis (DVT), a complication of immobility (eg, pulmonary embolism). Symptoms

include pleuritic chest pain, anxiety, shortness of breath, and abnormal blood gas values.

- Low-dose anticoagulation therapy is initiated to prevent DVT and pulmonary embolism, along with the use of antiembolism stockings or pneumatic compression devices. A permanent indwelling filter may be placed in the vena cava to prevent dislodged clots (emboli) from migrating to the lungs and causing pulmonary emboli.
- Patient is monitored for autonomic hyperreflexia (characterized by pounding headache, profuse sweating, nasal congestion, piloerection [gooseflesh], bradycardia, and hypertension).
- Constant surveillance is maintained for signs and symptoms of pressure ulcers and infection (urinary, respiratory, local infection at pin sites).

NURSING ALERT

The calves or thighs should never be massaged because of the danger of dislodging an undetected thromboemboli.

NURSING PROCESS

The Patient with Acute SCI

Assessment

- Observe breathing pattern; assess strength of cough; auscultate lungs.
- Monitor patient closely for any changes in motor or sensory function and for symptoms of progressive neurologic damage.
- Test motor ability by asking patient to spread fingers, squeeze examiner's hand, and move toes or turn the feet.
- Evaluate sensation by pinching the skin or touching it lightly with a tongue blade, starting at shoulder and working down both sides; patient's eyes should be closed. Ask patient where sensation is felt.
- Assess for spinal shock.
- Palpate lower abdomen for signs of urinary retention and overdistention of the bladder.

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- Assess for gastric dilation and paralytic ileus due to atonic bowel.
- Monitor temperature (hyperthermia may result due to autonomic disruption).

Diagnosis

Nursing Diagnoses

- Ineffective breathing patterns related to weakness or paralysis of abdominal and intercostal muscles and inability to clear secretions
- Ineffective airway clearance related to weakness of intercostal muscles
- Impaired bed and physical mobility related to motor and sensory impairment
- Disturbed sensory perception related to immobility and sensory loss
- Risk for impaired skin integrity related to immobility or sensory loss
- Impaired urinary elimination related to inability to void spontaneously
- Constipation related to presence of atonic bowel as a result of autonomic disruption
- Acute pain and discomfort related to treatment and prolonged immobility

Collaborative Problems/Potential Complications

- DVT
- Orthostatic hypotension
- Autonomic hyperreflexia

Planning and Goals

Major patient goals may include improved breathing pattern and airway clearance, improved mobility, improved sensory and perceptual awareness, maintenance of skin integrity, relief of urinary retention, improved bowel function, promotion of comfort, and absence of complications.

Nursing Interventions

Promoting Adequate Breathing and Airway Clearance

- Detect potential respiratory failure by observing patient, measuring vital capacity, and monitoring oxygen saturation through pulse oximetry and arterial blood gas values.

- Prevent retention of secretions and resultant atelectasis with early and vigorous attention to clearing bronchial and pharyngeal secretions.
- Suction with caution, because this procedure can stimulate the vagus nerve, producing bradycardia and cardiac arrest.
- Initiate chest physical therapy and assisted coughing to mobilize secretions if the patient cannot cough effectively.
- Supervise breathing exercises to increase strength and endurance of inspiratory muscles, particularly the diaphragm.
- Ensure proper humidification and hydration to maintain thin secretions.
- Assess for signs of respiratory infection: cough, fever, and dyspnea.
- Monitor respiratory status frequently.

Improving Mobility

- Maintain proper body alignment at all times.
- Reposition the patient frequently and assist patient out of bed as soon as the spinal column is stabilized.
- Apply splints (various types) to prevent footdrop and trochanter rolls to prevent external rotation of the hip joints; reapply every 2 hours.
- Patients with lesions above the midthoracic level may tolerate changes in position poorly; monitor BP when positions are changed.
- Do not turn patient who is not on a rotating specialty bed unless physician indicates that it is safe to do so.
- Perform passive range-of-motion exercises as soon as possible after injury to avoid complications such as contractures and atrophy.
- Provide a full range of motion at least four or five times daily to toes, metatarsals, ankles, knees, and hips.
- For patients who have a cervical fracture without neurologic deficit, reduction in traction followed by rigid immobilization for 6 to 8 weeks restores skeletal integrity. These patients are allowed to move gradually to an erect position. Apply a neck brace or molded collar when the patient is mobilized after traction is removed.

Promoting Adaptation to Disturbed Sensory Perception

- Stimulate the area above the level of the injury through touch, aromas, flavorful food and beverages, conversation, and music.
- Provide prism glasses to enable patient to see from supine position.
- Encourage use of hearing aids, if applicable.
- Provide emotional support; teach patient strategies to compensate for or cope with sensory deficits.

Maintaining Skin Integrity

- Change patient's position every 2 hours, and inspect the skin, particularly under cervical collar.
- Assess for redness or breaks in skin over pressure points; check perineum for soilage; observe catheter for adequate drainage; assess general body alignment and comfort.
- Wash skin every few hours with a mild soap, rinse well, and blot dry. Keep pressure-sensitive areas well lubricated and soft with bland cream or lotion.
- Teach patient about pressure ulcers and encourage participation in preventive measures.

Maintaining Urinary Elimination

- Perform intermittent catheterization to avoid overstretching the bladder and infection. If this is not feasible, insert an indwelling catheter.
- Show family members how to catheterize, and encourage them to participate in this facet of care.
- Teach patient to record fluid intake, voiding pattern, amounts of residual urine after catheterization, characteristics of urine, and any unusual feelings.

Improving Bowel Function

- Monitor reactions to gastric intubation.
- Provide a high-calorie, high-protein, and high-fiber diet. Food amount may be gradually increased after bowel sounds resume.
- Administer prescribed stool softener to counteract effects of immobility and analgesic agents, and institute a bowel program as early as possible.

Providing Comfort Measures

- Reassure patient in halo traction that he or she will adapt to steel frame (ie, feeling caged in and hearing noises).
- Cleanse pin sites daily, and observe for redness, drainage, and pain; observe for loosening. If one of the pins becomes detached, stabilize the patient's head in a neutral position and have someone notify the neurosurgeon; keep a torque screwdriver readily available.
- Inspect the skin under the halo vest for excessive perspiration, redness, and skin blistering, especially on the bony prominences. Open vest at the sides to allow torso to be washed. Do not allow vest to become wet; do not use powder inside vest.

Monitoring and Managing Potential Complications

THROMBOPHLEBITIS

Refer to "Medical Management" in text on "Vein Disorders" in Chapter V.

ORTHOSTATIC HYPOTENSION

Reduce frequency of hypotensive episodes by administering prescribed vasopressor medications. Provide antiembolism stockings and abdominal binders; allow time for slow position changes, and use tilt tables as appropriate. Close monitoring of vital signs before and during position changes is essential.

AUTONOMIC HYPERREFLEXIA

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- Perform a rapid assessment to identify and alleviate the cause of autonomic hyperreflexia and remove the trigger.
- Place patient immediately in sitting position to lower BP.
- Catheterize the patient to empty bladder immediately.
- Examine rectum for fecal mass. Apply topical anesthetic for 10 to 15 minutes before removing fecal mass.
- Examine skin for areas of pressure, irritation, or broken skin.
- As prescribed, administer a ganglionic blocking agent such as hydralazine hydrochloride (Apresoline) if the above measures do not relieve hypertension and excruciating headache.
- Label chart clearly and visibly, noting the risk for autonomic hyperreflexia.

- Instruct patient in prevention and management measures. Inform patient with lesion above T6 that hyperreflexic episode can occur years after initial injury.

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE

- Shift emphasis from ensuring that patient is stable and free of complications to specific assessment and planning for independence and the skills necessary for activities of daily living.
- Initially, focus patient teaching on the injury and its effects on mobility, dressing, and bowel, bladder, and sexual function. As the patient and family acknowledge the consequences of the injury and the resulting disability, broaden the focus of teaching to address issues necessary for carrying out the tasks of daily living and taking charge of their lives.

CONTINUING CARE

- Support and assist patient and family in assuming responsibility for increasing care and provide assistance in dealing with psychological impact of SCI and its consequences.
- Coordinate management team, and serve as liaison with rehabilitation centers and home care agencies.
- Reassure female patients with SCI that pregnancy is not contraindicated and fertility is relatively unaffected, but that pregnant women with acute or chronic SCI pose unique management challenges.
- Refer for home care nursing support as indicated or desired.
- Refer patient to mental health care professional as indicated.

Evaluation

Expected Patient Outcomes

- Demonstrates improvement in gas exchange and clearance of secretions
- Moves within limits of dysfunction, and demonstrates completion of exercises within functional limitations
- Demonstrates adaptation to sensory and perceptual alterations

- Demonstrates optimal skin integrity
- Regains urinary bladder function
- Regains bowel function
- Reports absence of pain and discomfort
- Is free of complications

For more information, see Chapter 63 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Syndrome of Inappropriate Antidiuretic Hormone Secretion

The syndrome of inappropriate antidiuretic hormone (SIADH) secretion refers to excessive antidiuretic hormone (ADH) secretion from the pituitary gland even in the face of subnormal serum osmolality. Patients with this disorder cannot excrete dilute urine. They retain fluids and develop sodium deficiency (dilutional hyponatremia). SIADH is often of nonendocrine origin. The syndrome may occur in patients with bronchogenic carcinoma (malignant lung cells synthesize and release ADH). Other causes include severe pneumonia, pneumothorax, other disorders of the lungs, and malignant tumors that affect other organs. Disorders of the central nervous system (head injury, brain surgery or tumor, or infection) are thought to produce SIADH by direct stimulation of the pituitary gland. Some medications (vincristine, diuretics, phenothiazines, tricyclic antidepressants) and nicotine have been implicated in SIADH.

Medical Management

SIADH is generally managed by eliminating the underlying cause if possible and restricting fluid intake. Diuretics are used with fluid restriction to treat severe hyponatremia.

Nursing Management

- Monitor fluid intake and output, daily weight, urine and blood chemistries, and neurologic status.
- Provide supportive measures and explanations of procedures and treatments to assist patient to deal with this disorder.

For more information, see Chapter 42 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Systemic Lupus Erythematosus

Systemic lupus erythematosus (SLE) is a chronic, inflammatory autoimmune collagen disease resulting from disturbed immune regulation that causes an exaggerated production of autoantibodies.

Pathophysiology

This disturbance is brought about by some combination of genetic, hormonal (as evidenced by the usual onset during the childbearing years), and environmental factors (sunlight, thermal burns). Certain medications, such as hydralazine (Apresoline), procainamide (Pronestyl), isoniazid or INH (Nydrazid), chlorpromazine (Thorazine), and some antiseizure medications, have been implicated in chemical or drug-induced SLE. Specifically, B cells and T cells both contribute to the immune response in SLE. B cells are instrumental in promoting the onset and flares of the disease.

Clinical Manifestations

Onset is insidious or acute. SLE can go undiagnosed for many years. The clinical course is one of exacerbations and remissions.

- Classic symptoms: fever, fatigue, weight loss, and possibly arthritis, pleurisy.
- Musculoskeletal system: Arthralgias and arthritis (synovitis) are common presenting features. Joint swelling, tenderness, and pain on movement are common, accompanied by morning stiffness.
- Integumentary system: Several different types are seen (eg, subacute cutaneous lupus erythematosus [SCLE], discoid lupus erythematosus [DLE]). A butterfly rash across the bridge of the nose and cheeks occurs in more than half of patients and may be a precursor to systemic involvement. Lesions worsen during exacerbations ("flares") and may be

provoked by sunlight or artificial ultraviolet light. Oral ulcers may involve buccal mucosa or hard palate.

- Cardiovascular system: Pericarditis is the most common clinical cardiac manifestation. Women who have SLE are also at risk for early atherosclerosis. Papular, erythematosus, and purpuric lesions may occur on fingertips, elbows, toes, and extensor surfaces of forearms or lateral sides of hands and may progress to necrosis.
- Varied and frequent neuropsychiatric presentations, generally demonstrated by subtle changes in behavior or cognitive ability.

Assessment and Diagnostic Findings

Diagnosis is based on a complete history, physical examination, and blood tests. No single laboratory test confirms SLE. Blood testing reveals moderate to severe anemia, thrombocytopenia, leukocytosis, or leukopenia and positive antinuclear antibodies. Other diagnostic immunologic tests support but do not confirm the diagnosis.

Medical Management

Treatment includes management of acute and chronic disease. Goals of treatment include preventing progressive loss of organ function, reducing the likelihood of acute disease, minimizing disease-related disabilities, and preventing complications from therapy. Monitoring is performed to assess disease activity and therapeutic effectiveness.

Pharmacologic Therapy

- Nonsteroidal anti-inflammatory drugs (NSAIDs) are used with corticosteroids to minimize corticosteroid requirements.
- Corticosteroids are used topically for cutaneous manifestations.
- IV administration of administration of corticosteroids is an alternative to traditional high-dose oral use.
- Cutaneous, musculoskeletal, and mild systemic features of SLE are managed with antimalarial drugs.
- Immunosuppressive agents are generally reserved for the most serious forms of SLE that have not responded to conservative therapies.

Nursing Management

The nursing care of the patient with SLE is generally the same as that for the patient with rheumatic disease (see "Nursing Management" under "Arthritis, Rheumatoid"). The primary nursing diagnoses address fatigue, impaired skin integrity, disturbed body image, and deficient knowledge.

- Be sensitive to the psychological reactions of the patient due to the changes and the unpredictable course of SLE; encourage participation in support groups, which can provide disease information, daily management tips, and social support.
- Teach patient to avoid sun and ultraviolet light exposure or to protect themselves with sunscreen and clothing.
- Because of the increased risk of involvement of multiple organ systems, teach patients the importance of routine periodic screenings as well as health promotion activities.
- Refer to dietician if necessary.
- Instruct the patient about the importance of continuing prescribed medications, and address the changes and potential side effects that are likely to occur with their use.
- Remind the patient of the importance of monitoring because of the increased risk of systemic involvement, including renal and cardiovascular effects.

For more information, see Chapter 54 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.



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Thrombocytopenia

Thrombocytopenia (low platelet count) is the most common cause of abnormal bleeding.

Pathophysiology

Thrombocytopenia can result from decreased production of platelets within the bone marrow or from increased destruction or consumption of platelets. Causes include failure of production as a result of hematologic malignancies, myelodysplastic syndromes, metastatic involvement of bone marrow from solid tumors, certain anemias, toxins, medications, infections, alcohol, and chemotherapy; increased destruction as a result of idiopathic thrombocytopenia purpura, lupus erythematosus, malignant lymphoma, chronic lymphocytic leukemia, medications, infections, and sequestration; and increased utilization, such as results from disseminated intravascular coagulopathy (DIC).

Clinical Manifestations

- With platelet count below 50,000/mm^3: bleeding and petechiae
- With platelet count below 20,000/mm^3: petechiae, along with nasal and gingival bleeding, excessive menstrual bleeding, and excessive bleeding after surgery or dental extractions
- With platelet count below 5,000/mm^3: spontaneous, potentially fatal central nervous system hemorrhage or gastrointestinal hemorrhage

Assessment and Diagnostic Findings

- Bone marrow aspiration and biopsy, if platelet deficiency is secondary to decreased production
- Increased megakaryocytes (the cells from which platelets originate) and normal or even increased platelet production in bone marrow, when platelet destruction is the cause

Medical Management

The management of secondary thrombocytopenia is usually treatment of the underlying disease. Platelet transfusions are used to raise platelet count and stop bleeding or prevent spontaneous hemorrhage if platelet production is impaired; if excessive platelet destruction is the cause, the patient is treated as indicated for idiopathic thrombocytopenia purpura. For some patients a splenectomy can be therapeutic, although it may not be an option for other patients (eg, patients in whom the enlarged spleen is due to portal hypertension related to cirrhosis).

Nursing Management

Interventions focus on preventing injury (eg, use soft toothbrush and electric razors, minimize needlestick procedures), stopping or slowing bleeding (eg, pressure, cold), and administering medications and platelets as ordered, as well as patient teaching. See "Nursing Management" under Idiopathic Thrombocytopenic Purpura" for additional information.

For more information, see Chapter 33 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Thyroiditis, Acute

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Thyroiditis (inflammation of the thyroid) can be acute, subacute, or chronic. Each type is characterized by inflammation, fibrosis, or lymphocytic infiltration of the thyroid gland. Acute thyroiditis is a rare disorder caused by infection of the thyroid gland. The causes are bacteria (*Staphylococcus aureus* most common), fungi, mycobacteria, or parasites. Subacute cases may be granulomatous thyroiditis (de Quervain's thyroiditis) or painless thyroiditis (silent thyroiditis or subacute lymphocytic thyroiditis). This form often occurs in the postpartum period and is thought to be an autoimmune reaction.

Clinical Manifestations

Acute Thyroiditis

- Anterior neck pain and swelling, fever, dysphagia, and dysphonia
- Pharyngitis or pharyngeal pain
- Warmth, erythema, and tenderness of the thyroid gland

Subacute Thyroiditis

- Myalgias, pharyngitis, low-grade fever, and fatigue, which progress to a painful swelling in the anterior neck that lasts 1 to 2 months and then disappears spontaneously without residual effect.
- Thyroid enlarges symmetrically and may be painful.
- Overlying skin is often reddened and warm.
- Swallowing may be difficult and uncomfortable.
- Irritability, nervousness, insomnia, and weight loss (manifestations of hyperthyroidism) are common.
- Chills and fever may occur.
- Painless thyroiditis: Symptoms of hyperthyroidism or hypothyroidism are possible.

Management

Acute Thyroiditis

- Antimicrobial agents and fluid replacement
- Surgical incision and drainage if abscess is present

Subacute Thyroiditis

- Control of inflammation; nonsteroidal anti-inflammatory drugs (NSAIDs) to relieve neck pain.
- Beta-blocking agents to control symptoms of hyperthyroidism.
- Oral corticosteroids to relieve pain and reduce swelling; do not usually affect the underlying cause.
- Follow-up monitoring.
- Painless thyroiditis: Treatment is directed at symptoms, and yearly follow-up is recommended to determine the patient's need for treatment of subsequent hypothyroidism.

For more information, see Chapter 42 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Thyroiditis, Chronic (Hashimoto's Thyroiditis)

Chronic thyroiditis occurs most frequently in women aged 30 to 50 years and is termed Hashimoto's disease, or chronic lymphocytic thyroiditis. Diagnosis is based on the histologic appearance of the inflamed gland. The chronic forms are usually not accompanied by pain, pressure symptoms, or fever, and thyroid activity is usually normal or low. Cell-mediated immunity may play a significant role in the pathogenesis of chronic thyroiditis. A genetic predisposition also appears to be significant in its etiology. If untreated, the disease slowly progresses to hypothyroidism.

Management

Objectives of treatment are to reduce the size of the thyroid gland and to prevent hypothyroidism.

- Thyroid hormone therapy is prescribed to reduce thyroid activity and production of thyroglobulin.
- Thyroid hormone is given when hypothyroid symptoms are present.
- Surgery is performed when pressure symptoms persist.

For more information, see Chapter 42 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Thyroid Storm (Thyrotoxic Crisis)

Thyroid storm (thyrotoxic crisis) is a form of severe hyperthyroidism, usually of abrupt onset and characterized by high fever (hyperpyrexia), extreme tachycardia, and altered mental state, which frequently appears as delirium. Thyroid storm is a life-threatening condition that is usually precipitated by stress, such as injury, infection, surgery, tooth extraction, insulin reaction, diabetic ketoacidosis, pregnancy, digitalis intoxication, abrupt withdrawal of antithyroid drugs, extreme emotional stress, or vigorous palpation of the thyroid. These factors precipitate thyroid storm in the partially controlled or

completely untreated patient with hyperthyroidism. Untreated thyroid storm is almost always fatal, but with proper treatment the mortality rate can be reduced substantially.

Clinical Manifestations

- High fever (hyperpyrexia) above 38.5°C (101.3°F)
- Extreme tachycardia (more than 130 beats/min)
- Exaggerated symptoms of hyperthyroidism with disturbances of a major system, such as gastrointestinal (weight loss, diarrhea, abdominal pain) or cardiovascular (edema, chest pain, dyspnea, palpitations)
- Altered neurologic or mental state, which frequently appears as delirium psychosis, somnolence, or coma

Medical Management

Immediate objectives are to reduce body temperature and heart rate and prevent vascular collapse.

- A hypothermia mattress or blanket, ice packs, cool environment, hydrocortisone, and acetaminophen (Tylenol).
- Humidified oxygen is administered to improve tissue oxygenation and meet high metabolic demands, and respiratory status is monitored by arterial blood gas analysis or pulse oximetry.
- Intravenous fluids containing dextrose are administered to replace glycogen stores.
- Hydrocortisone is given to treat shock or adrenal insufficiency.
- Propylthiouracil (PTU) or methimazole is given to impede formation of thyroid hormone.
- Hydrocortisone to treat shock or adrenal insufficiency.
- Iodine is administered to decrease output of thyroxine (T_4) from thyroid gland.
- Sympatholytic agents are given for cardiac problems. Propranolol, combined with digitalis, has been effective in reducing cardiac symptoms.

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NURSING ALERT

Salicylates are not used in the management of thyroid storm because they displace thyroid hormone from binding proteins and worsen the hypermetabolism.

Nursing Management

Observe patient carefully and provide aggressive and supportive nursing care during and after acute stage of illness. Care provided for the patient with hyperthyroidism is the basis for nursing management of patients with thyroid storm.

For more information, see Chapter 42 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Toxic Epidermal Necrolysis and Stevens–Johnson Syndrome

Toxic epidermal necrolysis and Stevens–Johnson syndrome are potentially fatal skin disorders and the most severe forms of erythema multiforme. Both conditions are triggered by medications. Antibiotics, antiseizure agents, NSAIDs, and sulfonamides are the medications most commonly implicated. The complete body surface may be involved, with widespread areas of erythema and blisters. Sepsis and keratoconjunctivitis are possible complications.

Clinical Manifestations

- Initial signs are conjunctival burning or itching, cutaneous tenderness, fever, headache, cough, sore throat, extreme malaise, and myalgias (aches and pains).
- Rapid onset of erythema follows, involving much of the skin surface and mucous membranes; large, flaccid bullae in some areas; in other areas, large sheets of epidermis are shed, exposing underlying dermis; fingernails, toenails, eyebrows, and eyelashes may all be shed, along with surrounding epidermis.
- Excruciatingly tender skin and loss of skin lead to a weeping surface similar to that of a total body partial-thickness burn; this condition may be referred to as scalded skin syndrome.
- In severe cases of mucosal involvement, there may be danger of damage to the larynx, bronchi, and esophagus from ulcerations.

Assessment and Diagnostic Methods

- Histologic studies of frozen skin cells
- Cytodiagnosis of cells from a freshly denuded area
- Immunofluorescent studies for atypical epidermal autoantibodies

Medical Management

Treatment goals include control of fluid and electrolyte balance, prevention of sepsis, and prevention of ophthalmic complications. The mainstay of treatment is supportive care.

- All nonessential medications are discontinued immediately.
- If possible, patient is treated in a regional burn center.
- Surgical debridement or hydrotherapy is used initially to remove involved skin.
- Tissue samples from the nasopharynx, eyes, ears, blood, urine, skin, and unruptured blisters are used to identify pathogens.
- Intravenous fluids are prescribed to maintain fluid and electrolyte balance.
- Fluid replacement is accomplished by nasogastric tube and orally as soon as possible.
- Systemic corticosteroids are given early in the disease process (controversial).
- Administration of intravenous immunoglobulin (IVIG) may provide rapid improvement and skin healing.
- Skin is protected with topical agents; topical antibacterial and anesthetic agents are used to prevent wound sepsis.
- Temporary biologic dressings (pigskin, amniotic membrane) or plastic semipermeable dressings (Vigilon) are applied.
- Meticulous oropharyngeal and eye care is essential when there is severe involvement of mucous membranes and eyes.

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NURSING PROCESS

The Patient with Toxic Epidermal Necrolysis

Assessment

- Inspect appearance and extent of involvement of skin. Monitor blister drainage for amount, color, and odor.

- Inspect oral cavity for blistering and erosive lesions daily. Determine patient's ability to swallow and drink fluids, as well as speak normally.
- Assess eyes daily for itching, burning, and dryness.
- Monitor vital signs, paying special attention to fever and respiratory status and secretions.
- Assess high fever, tachycardia, and extreme weakness and fatigue. (Indicate the process of epidermal necrosis, increased metabolic needs, and possible gastrointestinal and respiratory mucosal sloughing.)
- Monitor urine volume, specific gravity, and color.
- Inspect intravenous insertion sites for local signs of infection.
- Record daily weight.
- Question patient about fatigue and pain levels.
- Assess level of anxiety and coping mechanisms; identify new effective coping skills.

Diagnosis

Nursing Diagnoses

- Impaired tissue integrity (oral, eye, and skin) related to epidermal shedding
- Deficient fluid volume and electrolyte losses related to loss of fluids from denuded skin
- Risk for imbalanced body temperature (hypothermia) related to heat loss, secondary to skin loss
- Acute pain related to denuded skin, oral lesions, and possible infection
- Anxiety related to the physical appearance and prognosis

Collaborative Problems/Potential Complications

- Sepsis
- Conjunctival retraction, scars, and corneal lesions

Planning and Goals

Major goals may include skin and oral tissue healing, fluid balance, prevention of heat loss, relief of pain, reduced anxiety, and absence of complications.

Nursing Interventions

Maintaining Skin and Mucous Membrane Integrity

- Take special care to avoid friction involving the skin when moving the patient in bed; check skin after each

position change to ensure that no new denuded areas have appeared.
- Apply prescribed topical agents to reduce wound bacteria.
- Apply warm compresses gently, if prescribed, to denuded areas.
- Use topical antibacterial agent in conjunction with hydrotherapy; monitor treatment, and encourage patient to exercise extremities during hydrotherapy.
- Perform oral hygiene carefully. Use prescribed mouthwashes, anesthetics, or coating agents frequently to rid mouth of debris, soothe ulcerative areas, and control odor. Inspect oral cavity frequently, note changes, and report. Apply petrolatum to lips.

Attaining Fluid Balance
- Observe vital signs, urine output, and sensorium for signs of hypovolemia.
- Evaluate laboratory tests, and report abnormal results.
- Weigh patient daily.
- Provide enteral nourishment or, if necessary, parenteral nutrition.
- Record intake and output and daily calorie count.

Preventing Hypothermia
- Maintain patient's comfort and body temperature with cotton blankets, ceiling-mounted heat lamps, or heat shields.
- Work rapidly and efficiently when large wounds are exposed for wound care to minimize shivering and heat loss.
- Monitor patient's temperature carefully and frequently.

Relieving Pain
- Assess the patient's pain, its characteristics, factors that influence the pain, and the patient's behavioral responses.
- Administer prescribed analgesic agents, and observe for pain relief and side effects.
- Administer analgesic agents before painful treatments.
- Provide explanations and speak calmly to patient during treatments to allay anxiety, which may intensify pain.
- Provide measures to promote rest and sleep; provide emotional support and reassurance to achieve pain control.

- Teach self-management techniques for pain relief, such as progressive muscle relaxation and imagery.

Reducing Anxiety
- Assess emotional state (anxiety, fear of dying, and depression); reassure patient that these reactions are normal.
- Give support, be honest, and offer hope that the situation will improve.
- Encourage patient to express feelings to someone he or she trusts.
- Listen to patient's concerns; provide skillful, compassionate care.
- Provide emotional support during the long recovery period with psychiatric nurse, chaplain, psychologist, or psychiatrist.

Monitoring and Managing Potential Complications
- Sepsis: Monitor vital signs and note changes to allow early detection of infection. Maintain strict asepsis. If a large portion of the body is involved, place patient in private room with protective isolation.
- Conjunctival retraction, scars, and corneal lesions: Inspect eyes for progression of disease to keratoconjunctivitis (itching, burning, and dryness). Administer eye lubricant. Use eye patches. Encourage patient to avoid rubbing eyes. Document and report progression of symptoms.

Evaluation

Expected Patient Outcomes
- Achieves increasing skin and oral tissue healing
- Attains fluid balance
- Attains thermoregulation
- Achieves pain relief
- Appears less anxious
- Experiences no complication, such as sepsis and impaired vision

For more information, see Chapter 56 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Trigeminal Neuralgia (Tic Douloureux)

Trigeminal neuralgia, a condition affecting the fifth cranial nerve, is characterized by unilateral paroxysms of shooting and stabbing pain in the area innervated by any of the three branches, but most commonly the second and third branches of the trigeminal nerve. The pain ends as abruptly as it starts and is described as a unilateral shooting and stabbing sensation. The unilateral nature of the pain is an important feature. Associated involuntary contraction of the facial muscles can cause sudden closing of the eye or twitching of the mouth, hence the former name *tic douloureux* (painful twitch). Trigeminal neuralgia occurs most often before 35 years of age. Pain-free intervals may last minutes, hours, days, or longer. With advancing years, the painful episodes tend to become more frequent and agonizing. The patient lives in constant fear of attacks.

Pathophysiology

Although the cause is not certain, vascular compression and pressure are suggested causes. The disorder occurs more commonly in women and in people with multiple sclerosis (MS) compared with the general population.

Clinical Manifestations

- Paroxysms are aroused by any stimulation of terminals of the affected nerve branches (eg, washing the face, shaving, brushing teeth, eating, and drinking). Patients may avoid these activities (behavior provides a cue to diagnosis).
- Drafts of cold air and direct pressure against the nerve trunk may cause pain.
- Trigger points are areas where the slightest touch immediately starts a paroxysm.

Assessment and Diagnostic Methods

Diagnosis is based on characteristic behavior: avoiding stimulating trigger point areas (eg, trying not to touch or wash the face, shave, chew, or do anything else that might cause an attack).

Medical Management

Pharmacologic Therapy

Antiseizure agents, such as carbamazepine (Tegretol), reduce transmission of impulses at certain nerve terminals and relieve pain in most patients. Carbamazepine is given with meals. The patient is observed for side effects, including nausea, dizziness, drowsiness, and aplastic anemia. The patient is monitored for bone marrow depression during long-term therapy. Gabapentin and baclofen are also used to treat pain. If pain control is still not achieved, phenytoin (Dilantin) may be used as adjunctive therapy.

Surgical Management

In microvascular decompression of the trigeminal nerve, an intracranial approach (craniotomy) to decompress the trigeminal nerve is used. Percutaneous radiofrequency produces a thermal lesion on the trigeminal nerve. Although immediate pain relief is experienced, dysesthesia of the face and loss of the corneal reflex may occur. Use of stereotactic magnetic resonance imaging (MRI) for identification of the trigeminal nerve followed by gamma knife radiosurgery is being used at some medical centers. Percutaneous balloon microcompression disrupts large myelinated fibers in all three branches of the trigeminal nerve.

Nursing Interventions

- Assist patient to recognize the factors that trigger excruciating facial pain (eg, hot or cold food or water, jarring motions). Teach patient how to lessen these discomforts by using cotton pads and room temperature water to wash face.
- Instruct patient to rinse mouth after eating when tooth brushing causes pain and to perform personal hygiene during pain-free intervals.
- Advise patient to take food and fluids at room temperature, to chew on unaffected side, and to ingest soft foods.
- Recognize that anxiety, depression, and insomnia often accompany chronic painful conditions, and use appropriate interventions and referrals.
- Provide postoperative care by performing neurologic checks to assess facial motor and sensory deficits. Instruct patient

not to rub the eye if the surgery results in sensory deficits to the affected side of the face, because pain will not be felt in the event there is injury. Assess the eye for irritation or redness. Insert artificial tears, if prescribed, to prevent dryness to affected eye. Caution patient not to chew on the affected side until numbness diminishes. Observe patient carefully for any difficulty in eating and swallowing foods of different consistencies.

For more information, see Chapter 64 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Tuberculosis, Pulmonary

Tuberculosis (TB), an infectious disease primarily affecting the lung parenchyma, is most often caused by *Mycobacterium tuberculosis*. It may spread to almost any part of the body, including the meninges, kidney, bones, and lymph nodes. The initial infection usually occurs 2 to 10 weeks after exposure. The patient may then develop active disease because of a compromised or inadequate immune system response. The active process may be prolonged and characterized by long remissions when the disease is arrested, only to be followed by periods of renewed activity. TB is a worldwide public health problem that is closely associated with poverty, malnutrition, overcrowding, substandard housing, and inadequate health care. Mortality and morbidity rates continue to rise.

TB is transmitted when a person with active pulmonary disease expels the organisms. A susceptible person inhales the droplets and becomes infected. Bacteria are transmitted to the alveoli and multiply. An inflammatory reaction results in exudate in the alveoli and bronchopneumonia, granulomas, and fibrous tissue. Onset is usually insidious.

Risk Factors

- Close contact with someone who has active TB
- Immunocompromised status (eg, elderly, cancer, corticosteroid therapy, and HIV)

- Injection drug use and alcoholism
- People lacking adequate health care (eg, homeless or impoverished, minorities, children, and young adults)
- Preexisting medical conditions, including diabetes, chronic renal failure, silicosis, and malnourishment
- Immigrants from countries with a high incidence of TB (eg, Haiti, southeast Asia)
- Institutionalization (eg, long-term care facilities, prisons)
- Living in overcrowded, substandard housing
- Occupation (eg, health care workers, particularly those performing high-risk activities)

Clinical Manifestations

- Low-grade fever, cough, night sweats, fatigue, and weight loss
- Nonproductive cough, which may progress to mucopurulent sputum with hemoptysis

Assessment and Diagnostic Methods

- TB skin test (Mantoux test); QuantiFERON-TB Gold (QFT-G) test
- Chest x-ray
- Acid-fast bacillus smear
- Sputum culture

Gerontologic Considerations

Elderly patients may have atypical manifestations, such as unusual behavior or disturbed mental status, fever, anorexia, and weight loss. TB is increasingly encountered in the nursing home population. In many elderly people the TB skin test produces no reaction.

Medical Management

Pulmonary TB is treated primarily with antituberculosis agents for 6 to 12 months. A prolonged treatment duration is necessary to ensure eradication of the organisms and to prevent relapse.

Pharmacologic Therapy

- First-line medications: isoniazid or INH (Nydrazid), rifampin (Rifadin), pyrazinamide, and ethambutol (Myambutol) daily for 8 weeks and continuing for up to 4 to 7 months

- Second-line medications: capreomycin (Capastat), ethionamide (Trecator), para-aminosalicylate sodium, and cycloserine (Seromycin)
- Vitamin B (pyridoxine) usually administered with INH

Nursing Management

Promoting Airway Clearance

- Encourage increased fluid intake.
- Instruct about best position to facilitate drainage.

Advocating Adherence to Treatment Regimen

- Explain that TB is a communicable disease and that taking medications is the most effective way of preventing transmission.
- Instruct about medications, schedule, and side effects; monitor for side effects of anti-TB medications.
- Instruct about the risk of drug resistance if the medication regimen is not strictly and continuously followed.
- Carefully monitor vital signs and observe for spikes in temperature or changes in the patient's clinical status.
- Teach caregivers of patients who are not hospitalized to monitor the patient's temperature and respiratory status; report any changes in the patient's respiratory status to the primary health care provider.

Promoting Activity and Adequate Nutrition

- Plan a progressive activity schedule with the patient to increase activity tolerance and muscle strength.
- Devise a complementary plan to encourage adequate nutrition. A nutritional regimen of small, frequent meals and nutritional supplements may be helpful in meeting daily caloric requirements.
- Identify facilities (eg, shelters, soup kitchens, Meals on Wheels) that provide meals in the patient's neighborhood may increase the likelihood that the patient with limited resources and energy will have access to a more nutritious intake.

Preventing Spreading of TB Infection

- Carefully instruct the patient about important hygiene measures, including mouth care, covering the mouth and nose when coughing and sneezing, proper disposal of tissues, and handwashing.

- Report any cases of TB to the health department so that people who have been in contact with the affected patient during the infectious stage can undergo screening and possible treatment, if indicated.
- Instruct patient about the risk of spreading TB to other parts of the body (spread or dissemination of TB infection to nonpulmonary sites of the body is known as miliary TB).
- Carefully monitor patient for military TB: Monitor vital signs and observe for spikes in temperature as well as changes in renal and cognitive function; few physical signs may be elicited on physical examination of the chest, but at this stage the patient has a severe cough and dyspnea. Treatment of miliary TB is the same as for pulmonary TB.

For more information, see Chapter 23 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.



U

Ulcerative Colitis

Ulcerative colitis is a recurrent ulcerative and inflammatory disease of the mucosal and submucosal layers of the colon and rectum. It is a serious disease, accompanied by systemic complications and a high mortality rate; approximately 5% of patients with ulcerative colitis develop colon cancer. It is characterized by multiple ulcerations, diffuse inflammations, and desquamation or shedding of the colonic epithelium of the colonic epithelium, with alternating periods of exacerbation and remission. Bleeding occurs from the ulceration and the mucosa becomes edematous and inflamed, with continuous lesions and abscesses. Ulcerative colitis most commonly affects people of Caucasian and Jewish heritage.

Clinical Manifestations

- Predominant symptoms: diarrhea, passage of mucus and pus, left lower quadrant abdominal pain, intermittent tenesmus, and rectal bleeding.
- Bleeding may be mild or severe; pallor, anemia, and fatigue result.
- Anorexia, weight loss, fever, vomiting, dehydration, cramping, and feeling an urgent need to defecate (may report passing 10 to 20 liquid stools daily).
- Hypocalcemia may occur.
- Rebound tenderness in right lower quadrant.
- Skin lesions, eye lesions (uveitis), joint abnormalities, and liver disease.

Assessment and Diagnostic Methods

- Assess for tachypnea, tachycardia, hypotension, fever, and pallor.
- Abdomen is examined for bowel sounds, distention, and tenderness.

- Stool examination to rule out dysentery, occult blood test.
- Abdominal x-rays, computed tomography (CT), magnetic resonance imaging (MRI).
- Sigmoidoscopy or colonoscopy and barium enema.
- Blood studies (low hematocrit and hemoglobin, high white blood cell count, decreased albumin level, electrolyte imbalance).

Medical Management

Medical treatment for both Crohn's disease and ulcerative colitis is aimed at reducing inflammation, suppressing inappropriate immune responses, providing rest for a diseased bowel so that healing may take place, improving quality of life, and preventing or minimizing complications.

Nutritional Therapy

Initial therapy consists of diet and fluid management with oral fluids; low-residue, high-protein, high-calorie diets; supplemental vitamin therapy; and iron replacement. Fluid and electrolyte balance may be corrected by intravenous (IV) therapy. Additional treatment measures include smoking cessation and avoiding foods that exacerbate symptoms, such as milk and cold foods. Parenteral nutrition (PN) may be provided as indicated.

Pharmacologic Therapy

- Sedative, antidiarrheal, and antiperistaltic medications
- Aminosalicylates: sulfasalazine (Azulfidine); effective for mild or moderate inflammation
- Corticosteroids (eg, oral: prednisone [Deltasone]; parenteral: hydrocortisone [Solu-Cortef]; topical: budesonide [Entocort])
- Immunomodulator agents (eg, azathioprine [Imuran])
- Biologic agents (eg, infliximab [Remicade])

Surgical Management

When nonsurgical measures fail to relieve the severe symptoms of inflammatory bowel disease, surgery may be recommended. A common procedure performed for strictures of the small intestines is laparoscope-guided strictureplasty. In some cases, a small bowel resection is performed. In cases of severe Crohn's disease of the colon, a total colectomy and ileostomy may be the procedure of choice. A newer option may be intestinal

transplantation, especially for children and young adults who have lost intestinal function because of the disease. At least 25% of patients with ulcerative colitis eventually have total colectomies. Proctocolectomy with ileostomy (ie, complete excision of colon, rectum, and anus) is recommended when the rectum is severely diseased. If the rectum can be preserved, restorative proctocolectomy with ileal pouch anal anastomosis (IPAA) is the procedure of choice. Fecal diversions may be needed.

NURSING PROCESS

THE PATIENT WITH INFLAMMATORY BOWEL DISEASE

Both regional enteritis (Crohn's disease) and ulcerative colitis are categorized as inflammatory bowel diseases. Box U-1 lists assessment findings that help distinguish one from the other.

Assessment

- Determine the onset, duration, and characteristics of abdominal pain; the presence of diarrhea or fecal urgency, straining at stool (tenesmus), nausea, anorexia, or weight loss; and family history.

BOX U-1 *Nursing Assessment Findings in Ulcerative Colitis and Regional Enteritis*

Ulcerative Colitis

- Dominant sign is rectal bleeding.
- Distended abdomen with rebound tenderness may be present.

Regional Enteritis

- Most prominent symptom is intermittent pain associated with diarrhea that does not decrease with defecation.
- Pain usually localized in the right lower quadrant.
- Abdominal tenderness noted on palpation.
- Periumbilical regional pain suggesting involvement of terminal ileum.

- Explore dietary pattern, including amounts of alcohol, caffeine, and nicotine used daily or weekly.
- Determine bowel elimination patterns, including character, frequency, and presence of blood, pus, fat, or mucus.
- Inquire about allergies, especially to milk (lactose).
- Ask about sleep pattern disturbances if diarrhea or pain occurs at night.

Diagnosis

Nursing Diagnoses

- Diarrhea related to inflammatory process
- Acute pain related to increased peristalsis and gastrointestinal inflammation
- Deficient fluid volume related to anorexia, nausea, and diarrhea
- Imbalanced nutrition, less than body requirements, related to dietary restrictions, nausea, and malabsorption
- Activity intolerance related to generalized weakness
- Anxiety related to impending surgery
- Ineffective individual coping related to repeated episodes of diarrhea
- Risk for impaired skin integrity related to malnutrition and diarrhea
- Risk for ineffective management of therapeutic regimen related to insufficient knowledge concerning process and management of disease

Collaborative Problems/Potential Complications

- Electrolyte imbalance
- Cardiac dysrhythmias related to electrolyte imbalances
- Gastrointestinal bleeding with fluid volume loss
- Perforation of bowel

Planning and Goals

Major goals may include attainment of normal bowel elimination patterns, relief of abdominal pain and cramping, prevention of fluid volume deficit, maintenance of optimal nutrition and weight, avoidance of fatigue, reduction of anxiety, promotion of effective coping, absence of skin breakdown, increased knowledge about the disease process and therapeutic regimen, and avoidance of complications.

Nursing Interventions

Maintaining Normal Elimination Patterns

- Provide ready access to bathroom, commode, or bedpan; keep environment clean and odor-free.
- Administer antidiarrheal agents as prescribed, and record frequency and consistency of stools after therapy has started.
- Encourage bed rest to decrease peristalsis.

Relieving Pain

- Describe character of pain (dull, burning, or cramplike) and its onset, pattern, and medication relief.
- Administer anticholinergic medications 30 minutes before a meal to decrease intestinal motility.
- Give analgesic agents as prescribed; reduce pain by position changes, local application of heat (as prescribed), diversional activities, and prevention of fatigue.

Maintaining Fluid Intake

- Record intake and output, including wound or fistula drainage.
- Monitor weight daily.
- Assess for signs of fluid volume deficit: dry skin and mucous membranes, decreased skin turgor, oliguria, fatigue, decreased temperature, increased hematocrit, elevated urine specific gravity, and hypotension.
- Encourage oral intake; monitor IV flow rate.
- Initiate measures to decrease diarrhea: dietary restrictions, stress reduction, and antidiarrheal agents.

Maintaining Optimal Nutrition

- Use PN when symptoms are severe.
- Record fluid intake and output and daily weights during PN therapy; test for glucose every 6 hours.
- Give feedings high in protein and low in fat and residue after PN therapy; note intolerance (eg, vomiting, diarrhea, distention).
- Provide small, frequent, low-residue feedings if oral foods are tolerated.
- Restrict activities to conserve energy, reduce peristalsis, and reduce calorie requirements.

Promoting Rest

- Recommend intermittent rest periods during the day; schedule or restrict activities to conserve energy and reduce metabolic rate.
- Encourage activity within limits; advise bed rest with active or passive exercises for a patient who is febrile, has frequent stools, or is bleeding.
- If the patient cannot perform active exercises, perform passive exercises and joint range of motion for the patient.

Reducing Anxiety

Tailor information about impending surgery to patient's level of understanding and desire for detail; pictures and illustrations help explain the surgical procedure and help the patient visualize what a stoma looks like.

Enhancing Coping Measures

- Develop a relationship with the patient that supports all attempts to cope with stressors of anxiety, discouragement, and depression.
- Implement stress reduction measures such as relaxation techniques, visualization, breathing exercises, and biofeedback.
- Refer to professional counseling if needed.

Preventing Skin Breakdown

- Examine skin, especially perianal skin.
- Provide perianal care after each bowel movement.
- Give immediate care to reddened or irritated areas over bony prominences.
- Use pressure-relieving devices to avoid skin breakdown.
- Consult with a wound–ostomy–continence nurse as indicated.

Monitoring and Managing Potential Complications

- Monitor serum electrolyte levels; administer replacements.
- Report dysrhythmias or change in level of consciousness (LOC).
- Monitor rectal bleeding, and give blood and volume expanders.
- Monitor blood pressure; obtain laboratory blood studies; administer vitamin K as prescribed.

- Monitor for indications of perforation: acute increase in abdominal pain, rigid abdomen, vomiting, or hypotension.
- Monitor for signs of obstruction and toxic megacolon: abdominal distention, decreased or absent bowel sounds, change in mental status, fever, tachycardia, hypotension, dehydration, and electrolyte imbalances.

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE

- Assess need for additional information about medical management (medications, diet) and surgical interventions.
- Provide information about nutritional management (bland, low-residue, high-protein, high-calorie, and high-vitamin diet).
- Give rationale for using corticosteroids and anti-inflammatory, antibacterial, antidiarrheal, and antispasmodic medications.
- Emphasize importance of taking medications as prescribed and not abruptly discontinuing regimen.
- Review ileostomy care as necessary. Obtain patient education information from the Crohn's and Colitis Foundation of America.

CONTINUING CARE

- Refer for home care nurse if nutritional status is compromised and patient is receiving PN.
- Explain that disease can be controlled and patient can lead a healthy life between exacerbations.
- Instruct about medications and the need to take them on schedule while at home. Recommend use of medication reminders (containers that separate pills according to day and time).
- Encourage patient to rest as needed and modify activities according to energy levels during a flare-up. Advise patient to limit tasks that impose strain on the lower abdominal muscles and to sleep close to bathroom because of frequent diarrhea. Suggest room deodorizers for odor control.
- Recommend low-residue, high-protein, high-calorie diet during an acute phase. Encourage patient to keep a record

of foods that irritate bowel and to eliminate them from diet. Recommend intake of eight glasses of water per day.
- Provide support for prolonged nature of disease because it is a strain on family life and financial resources. Arrange for individual and family counseling as indicated.
- Provide time for patient to express fears and frustrations.

Evaluation

Expected Patient Outcomes

- Reports decrease in frequency of diarrheal stools
- Experiences less pain
- Maintains fluid volume balance
- Attains optimal nutrition
- Avoids fatigue
- Experiences less anxiety
- Copes successfully with diagnosis
- Maintains skin integrity
- Acquires an understanding of the disease process
- Recovers without complications

For more information, see Chapter 38 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Unconscious Patient

Unconsciousness is an altered LOC in which the patient is unresponsive to and unaware of environmental stimuli, usually for a short duration. Coma is a clinical state—an unarousable unresponsive condition—in which the patient is unaware of self or the environment for prolonged periods (days to months, or even years). Akinetic mutism is a state of unresponsiveness to the environment in which the patient makes no voluntary movement. A persistent vegetative state is one in which the unresponsive patient resumes sleep–wake cycles after coma but is devoid of cognitive or affective mental function. Locked-in syndrome results from a lesion affecting the pons and results in paralysis and the inability to speak, but vertical eye movements and lid elevation remain intact and

are used to indicate responsiveness. The causes of unconsciousness may be neurologic (head injury, stroke), toxicologic (drug overdose, alcohol intoxication), or metabolic (hepatic or renal failure, diabetic ketoacidosis).

Assessment and Diagnostic Methods

- Neurologic examination (CT, MRI, positron emission tomography [PET], electroencephalography [EEG], single photon emission CT [SPECT]) to identify cause of loss of consciousness.
- Laboratory tests: analysis of blood glucose, electrolytes, serum ammonia, and liver function tests; blood urea nitrogen (BUN) levels; serum osmolality; calcium level; and partial thromboplastin and prothrombin times.
- Other studies may be used to evaluate serum ketones, alcohol and drug concentrations, and arterial blood gases.

Medical Management

The first priority is a patent and secure airway (intubation or tracheostomy). Then circulatory status (carotid pulse, heart rate and impulse, blood pressure) is assessed and adequate oxygenation maintained. An IV line is established to maintain fluid balance status, and nutritional support is provided (feeding tube or gastrostomy). Neurologic care is based on specific pathology. Other measures include drug therapy and measures to prevent complications.

NURSING PROCESS

The Unconscious Patient

U

Assessment

- Assess level of responsiveness (consciousness) using the Glasgow Coma Scale. Assess also the patient's ability to respond verbally. Evaluate pupil size, equality, and reaction to light; note movement of eyes.
- Assess for spontaneous, purposeful, or nonpurposeful responses: decorticate posturing (arms flexed, adducted, and internally rotated, and legs in extension) or decerebrate posturing (extremities extended and reflexes exaggerated).

- Rule out paralysis or stroke as cause of flaccidity.
- Examine respiratory status, eye signs, reflexes, and body functions (circulation, respiration, elimination, fluid and electrolyte balance) in a systematic manner.

Diagnosis

Nursing Diagnoses

- Ineffective airway clearance related to inability to clear respiratory secretions
- Risk for fluid volume deficit related to inability to ingest fluids
- Impaired oral mucous membranes related to mouth breathing, absence of pharyngeal reflex, and inability to ingest fluids
- Risk for impaired skin integrity related to immobility or restlessness
- Impaired tissue integrity of cornea related to diminished or absent corneal reflex
- Ineffective thermoregulation related to damage to hypothalamic center
- Impaired urinary elimination (incontinence or retention) related to impairment in neurologic sensing and control
- Bowel incontinence related to impairment in neurologic sensing and control and also related to changes in nutritional delivery methods
- Disturbed sensory perception related to neurologic impairment
- Interrupted family processes related to health crisis

Collaborative Problems/Potential Complications

- Respiratory distress or failure
- Pneumonia
- Aspiration
- Pressure ulcer
- Deep vein thrombosis
- Contractures

Planning and Goals

Goals of care during the unconscious period may include maintenance of a clear airway, protection from injury, attainment of fluid volume balance, achievement of intact oral mucous

membranes, maintenance of normal skin integrity, absence of corneal irritation, attainment of effective thermoregulation, effective urinary elimination, bowel continence, accurate perception of environmental stimuli, maintenance of intact family or support system, and absence of complications.

Nursing Interventions

Maintaining the Airway

- Establish an adequate airway, and ensure ventilation.
- Position patient in a lateral or semiprone position; do not allow patient to remain on back.
- Remove secretions to reduce danger of aspiration; elevate head of bed to a 30-degree angle to prevent aspiration; provide frequent suctioning and oral hygiene.
- Promote pulmonary hygiene with chest physiotherapy and postural drainage.
- Auscultate chest every 8 hours to detect adventitious breath sounds or absence of breath sounds.
- Maintain patency of endotracheal tube or tracheostomy; monitor arterial blood gases; maintain ventilator settings.

Protecting the Patient

- Provide padded side rails for protection; keep two rails in the raised position during the day and three at night.
- Prevent injury from invasive lines and equipment, and identify other potential sources of injury, such as restraints, tight dressings, environmental irritants, damp bedding or dressings, and tubes and drains.
- Protect the patient's dignity and privacy; act as the patient's advocate.

NURSING ALERT

If the patient begins to emerge from unconsciousness, every measure that is available and appropriate for calming and quieting the patient should be used. Any form of restraint is likely to be countered with resistance, leading to self-injury or to a dangerous increase in intracranial pressure (ICP). Therefore, physical restraints should be avoided if possible; a written prescription must be obtained if their use is essential for the patient's well-being.

Maintaining Fluid Balance and Managing Nutritional Needs

- Assess for hydration status: Examine tissue turgor and mucous membranes, assess intake and output trends, and analyze laboratory data.
- Meet fluid needs by giving required IV fluids and then nasogastric or gastrostomy feedings.
- Give IV fluids and blood transfusions slowly if patient has an intracranial condition.
- Never give oral fluids to a patient who cannot swallow; insert feeding tube for administration of enteral feedings.

Providing Mouth Care

- Inspect mouth for dryness, inflammation, and crusting; cleanse and rinse carefully to remove secretions and crusts and keep membranes moist; apply petrolatum to lips.
- Assess sides of mouth and lips for ulceration if patient has an endotracheal tube. Move tube to opposite side of mouth daily.
- If the patient is intubated and mechanically ventilated, good oral care is also necessary; recent evidence shows that routine toothbrushing every 8 hours significantly decreases ventilator-associated pneumonia.

Maintaining Skin and Joint Integrity

- Follow a regular schedule of turning and repositioning to prevent breakdown and necrosis of the skin, and to provide kinesthetic, proprioceptive, and vestibular stimulation.
- Give passive exercise of extremities to prevent contractures; use a splint or foam boots to prevent footdrop and eliminate pressure on toes.
- Keep hip joints and legs in proper alignment with supporting trochanter rolls.
- Position arms in abduction, fingers lightly flexed, and hands in slight supination; assess heels of feet for pressure areas.
- Specialty beds, such as fluidized or low-air-loss beds, may be used to decrease pressure on bony prominences.

Preserving Corneal Integrity

- Cleanse eyes with cotton balls moistened with sterile normal saline to remove debris and discharge.

- Instill artificial tears every 2 hours, as prescribed.
- Use cold compresses as prescribed for periorbital edema after cranial surgery. Avoid contact with cornea.
- Use eye patches cautiously because of potential for further corneal abrasions.

Maintaining Body Temperature
- Adjust environment to promote normal body temperature.
- Use prescribed measures to treat hyperthermia: Remove bedding, except light sheet; give acetaminophen as prescribed; give cools sponge baths, use hypothermia blanket; monitor frequently to assess response to therapy.

NURSING ALERT

Take rectal or tympanic (unless contraindicated) body temperature.

Preventing Urinary Retention
- Palpate or scan bladder at intervals to detect urinary retention.
- Insert indwelling catheter if there are signs of urinary retention; observe for fever and cloudy urine; inspect urethral orifice for drainage.
- Use external penile catheter (condom catheter) for male patients and absorbent pads for female patients if they can urinate spontaneously.
- Initiate bladder training program as soon as conscious.
- Monitor frequently for skin irritation and breakdown; implement appropriate skin care.

Promoting Bowel Function
- Evaluate abdominal distention by listening for bowel sounds and measuring abdominal girth.
- Monitor number and consistency of bowel movements; perform rectal examination for signs of fecal impaction; patient may require enema every other day to empty lower colon.
- Administer stool softeners and glycerin suppositories as indicated.

Promoting Sensory Stimulation

- Provide continuing sensory stimulation (eg, auditory, visual, olfactory, gustatory, tactile, and kinesthetic activities) to help patient overcome profound sensory deprivation.
- Make efforts to maintain usual day and night patterns of activity and sleep; orient patient to time and place every 8 hours.
- Touch and talk to patient; encourage family and friends to do the same; avoid making any negative comments about patient's status in patient's presence. Avoid overstimulating patient.
- Explain to family that periods of agitation may be a sign of increasing patient awareness of the environment.
- Introduce sounds from patient's usual environment if possible by means of audiotape and videotape.
- Read favorite books and provide familiar radio and television programs to enrich environment.

Meeting the Family's Needs

- Reinforce and clarify information about patient's condition to permit family members to mobilize their own adaptive capacities.
- Encourage ventilation of feelings and concerns.
- Support family in decision-making process concerning posthospital management and placement or end-of-life care.

Monitoring and Managing Potential Complications

- Monitor vital signs and respiratory function for signs of respiratory failure or distress.
- Assess for adequate red blood cells to carry oxygen: total blood cell count and arterial blood gases.
- Initiate chest physiotherapy and suctioning to prevent respiratory complications such as pneumonia.
- Perform oral care interventions for patients receiving mechanical ventilation to decrease the incidence of pneumonia.
- If pneumonia develops, obtain culture specimens to identify organism for selection of appropriate antibiotic.
- Monitor for evidence of impaired skin integrity, and implement strategies to prevent skin breakdown and pressure ulcers.

- Address factors that contribute to impaired skin integrity, and undertake strategies to promote healing if pressure ulcers do develop.
- Monitor for signs and symptoms of deep vein thrombosis (redness and swelling).

Evaluation

Expected Patient Outcomes

- Maintains clear airway and demonstrates appropriate breath sounds
- Experiences no injuries
- Attains or maintains adequate fluid balance
- Attains or maintains healthy oral mucous membranes
- Maintains normal skin integrity
- Has no corneal irritation
- Attains or maintains thermoregulation
- Has no urinary retention
- Has no diarrhea or fecal impaction
- Receives appropriate sensory stimulation
- Has family members who cope with crisis
- Avoids other complications

For more information, see Chapter 61 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Urolithiasis

Urolithiasis refers to stones (calculi) in the urinary tract. Stones are formed in the urinary tract when the urinary concentration of substances such as calcium oxalate, calcium phosphate, and uric acid increases. Stones vary in size from minute granular deposits to the size of an orange. Factors that favor formation of stones include infection, urinary stasis, and periods of immobility, all of which slow renal drainage and alter calcium metabolism. The problem occurs predominantly in the third to fifth decades and affects men more often than women.

Clinical Manifestations

Manifestations depend on the presence of obstruction, infection, and edema. Symptoms range from mild to excruciating pain and discomfort.

Stones in Renal Pelvis

- Intense, deep ache in costovertebral region
- Hematuria and pyuria
- Pain that radiates anteriorly and downward toward bladder in female and toward testes in male
- Acute pain, nausea, vomiting, costovertebral area tenderness (renal colic)
- Abdominal discomfort, diarrhea

Ureteral Colic (Stones Lodged in Ureter)

- Acute, excruciating, colicky, wavelike pain, radiating down the thigh to the genitalia
- Frequent desire to void, but little urine passed; usually contains blood because of the abrasive action of the stone (known as ureteral colic)

Stones Lodged in Bladder

- Symptoms of irritation associated with urinary tract infection and hematuria
- Urinary retention, if stone obstructs bladder neck
- Possible urosepsis if infection is present with stone

Assessment and Diagnostic Methods

- Diagnosis is confirmed by x-rays of the kidneys, ureters, and bladder (KUB) or by ultrasonography, IV urography, or retrograde pyelography.
- Blood chemistries and a 24-hour urine test for measurement of calcium, uric acid, creatinine, sodium, pH, and total volume.
- Chemical analysis is performed to determine stone composition.

Medical Management

Basic goals are to eradicate the stone, determine the stone type, prevent nephron destruction, control infection, and relieve any obstruction that may be present.

Pharmacologic and Nutritional Therapy

- Opioid analgesic agents (to prevent shock and syncope) and nonsteroidal anti-inflammatory drugs (NSAIDs).
- Increased fluid intake to assist in stone passage, unless patient is vomiting; patients with renal stones should drink eight to ten 8-oz glasses of water daily or have IV fluids prescribed to keep the urine dilute.
- For calcium stones: reduced dietary protein and sodium intake; liberal fluid intake; medications to acidify urine, such as ammonium chloride and thiazide diuretics if parathormone production is increased.
- For uric stones: low-purine and limited protein diet; allopurinol (Zyloprim).
- For cystine stones: low-protein diet; alkalinization of urine; increased fluids.
- For oxalate stones: dilute urine; limited oxalate intake (spinach, strawberries, rhubarb, chocolate, tea, peanuts, and wheat bran).

Stone Removal Procedures

- Ureteroscopy: stones fragmented with use of laser, electrohydraulic lithotripsy, or ultrasound and then removed.
- Extracorporeal shock wave lithotripsy (ESWL).
- Percutaneous nephrostomy; endourologic methods.
- Electrohydraulic lithotripsy.
- Chemolysis (stone dissolution): alternative for those who are poor risks for other therapies, refuse other methods, or have easily dissolved stones (struvite).
- Surgical removal is performed in only 1% to 2% of patients.

NURSING PROCESS

The Patient with Kidney Stones

Assessment

- Assess for pain and discomfort, including severity, location, and radiation of pain.

- Assess for associated symptoms, including nausea, vomiting, diarrhea, and abdominal distention.
- Observe for signs of urinary tract infection (chills, fever, frequency, and hesitancy) and obstruction (frequent urination of small amounts, oliguria, or anuria).
- Observe urine for blood; strain for stones or gravel.
- Focus history on factors that predispose patient to urinary tract stones or that may have precipitated current episode of renal or ureteral colic.
- Assess patient's knowledge about renal stones and measures to prevent recurrence.

Diagnosis

Nursing Diagnoses

- Acute pain related to inflammation, obstruction, and abrasion of the urinary tract
- Deficient knowledge regarding prevention of recurrence of renal stones

Collaborative Problems/Potential Complications

- Infection and urosepsis (from urinary tract infection and pyelonephritis)
- Obstruction of the urinary tract by a stone or edema, with subsequent acute renal failure

Planning and Goals

Major goals may include relief of pain and discomfort, prevention of recurrence of renal stones, and absence of complications.

Nursing Interventions

Relieving Pain

- Administer opioid analgesics (IV or intramuscular) with IV NSAID as prescribed.
- Encourage and assist patient to assume a position of comfort.
- Assist patient to ambulate to obtain some pain relief.
- Monitor pain closely and report promptly increases in severity.

Monitoring and Managing Complications

- Encourage increased fluid intake and ambulation.
- Begin IV fluids if patient cannot take adequate oral fluids.
- Monitor total urine output and patterns of voiding.
- Encourage ambulation as a means of moving the stone through the urinary tract.
- Strain urine through gauze.
- Crush any blood clots passed in urine, and inspect sides of urinal and bedpan for clinging stones.
- Instruct patient to report decreased urine volume, bloody or cloudy urine, fever, and pain.
- Instruct patient to report any increase in pain.
- Monitor vital signs for early indications of infection; infections should be treated with the appropriate antibiotic agent before efforts are made to dissolve the stone.

Promoting Home- and Community-Based Care

TEACHING PATIENTS SELF-CARE

- Explain causes of kidney stones and ways to prevent recurrence.
- Encourage patient to follow a regimen to avoid further stone formation, including maintaining a high fluid intake.
- Encourage patient to drink enough to excrete 3,000 to 4,000 mL of urine every 24 hours.
- Recommend that patient have urine cultures every 1 to 2 months the first year and periodically thereafter.
- Recommend that recurrent urinary infection be treated vigorously.
- Encourage increased mobility whenever possible; discourage excessive ingestion of vitamins (especially vitamin D) and minerals.
- If patient had surgery, instruct about the signs and symptoms of complications that need to be reported to the physician; emphasize the importance of follow-up to assess kidney function and to ensure the eradication or removal of all kidney stones to the patient and family.
- If patient had ESWL, encourage patient to increase fluid intake to assist in the passage of stone fragments; inform

the patient to expect hematuria and possibly a bruise on the treated side of the back; instruct patient to check his or her temperature daily and notify the physician if the temperature is greater than 38°C (about 101°F), or the pain is unrelieved by the prescribed medication.
- Provide instructions for any necessary home care and follow-up.

PROVIDING HOME AND FOLLOW-UP CARE AFTER ESWL

- Instruct patient to increase fluid intake to assist passage of stone fragments (may take 6 weeks to several months after procedure).
- Instruct patient about signs and symptoms of complications: fever, decreasing urinary output, and pain.
- Inform patient that hematuria is anticipated but should subside in 24 hours.
- Give appropriate dietary instructions based on composition of stones.
- Encourage regimen to avoid further stone formation; advise patient to adhere to prescribed diet.
- Teach patient to take sufficient fluids in the evening to prevent urine from becoming too concentrated at night.

CONTINUING CARE

- Closely monitor the patient to ensure that treatment has been effective and that no complications have developed.
- Assess the patient's understanding of ESWL and possible complications; assess the patient's understanding of factors that increase the risk of recurrence of renal calculi and strategies to reduce those risks.
- Assess the patient's ability to monitor urinary pH and interpret the results during follow-up visits.
- Ensure that the patient understands the signs and symptoms of stone formation, obstruction, and infection and the importance of reporting these signs promptly.
- If medications are prescribed for the prevention of stone formation, explain their actions, importance, and side effects to the patient.

Evaluation

Expected Patient Outcomes

- Reports relief of pain
- States increased knowledge of health-seeking behaviors to prevent recurrence
- Experiences no complications

For more information, see Chapter 45 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.



V

Vein Disorders: Venous Thrombosis, Thrombophlebitis, Phlebothrombosis, and Deep Vein Thrombosis

Although the vein disorders described here do not necessarily present an identical pathology, for clinical purposes these terms are often used interchangeably. The exact cause of venous thrombosis remains unclear, although three factors (Virchow's triad) are believed to play a significant role in its development: stasis of blood (venous stasis), vessel wall injury, and altered blood coagulation.

Thrombophlebitis is an inflammation of the walls of the veins, often accompanied by the formation of a clot. When a clot develops initially in the veins as a result of stasis or hypercoagulability, but without inflammation, the process is referred to as phlebothrombosis.

Venous thrombosis can occur in any vein but is most frequent in the veins of the lower extremities than the upper extremities. Both superficial and deep veins of the legs may be affected. Damage to the lining of blood vessels creates a site for clot formation, and increased blood coagulability occurs in patients who abruptly stop taking anticoagulant medications and also occurs with oral contraceptive use and several blood dyscrasias. The danger associated with venous thrombosis is that parts of a clot can become detached and produce an embolic occlusion of the pulmonary blood vessels.

Risk Factors

- History of varicose veins, hypercoagulation, neoplastic disease, cardiovascular disease, or recent major surgery or injury
- Obesity
- Advanced age
- Oral contraceptive use

Clinical Manifestations

- Signs and symptoms are nonspecific.
- Edema and swelling of the extremity resulting from obstruction of the deep veins of the leg; bilateral swelling may be difficult to detect (lack of size difference).
- Skin over the affected leg may become warmer; superficial veins may become more prominent (cordlike venous segment).
- Tenderness occurs later and is detected by gently palpating the leg.
- Homans' sign (pain in the calf after sharp dorsiflexion of the foot) is *NOT* specific for deep vein thrombosis (DVT) because it can be elicited in any painful condition of the calf.
- In some cases, signs of a pulmonary embolus are the first indication of DVT.
- Thrombus of superficial veins produces pain or tenderness, redness, and warmth in the involved area.
- In massive iliofemoral venous thrombosis (phlegmasia cerulea dolens), the entire extremity becomes massively swollen, tense, painful, and cool to touch.

Assessment and Diagnostic Methods

- History revealing risk factors such as varicose veins or neoplastic disease.
- Doppler ultrasonography, duplex ultrasonography, air plethysmography, contrast phlebography (venography).

Prevention

Prevention is dependent on identifying risk factors for thrombus and on educating the patient about appropriate interventions.

Medical Management

Objectives of management are to prevent the thrombus from growing and fragmenting, resolve the current thrombus, and prevent recurrence.

Pharmacologic Therapy

- Unfractionated heparin is administered for 5 days by intermittent or continuous intravenous (IV) infusion. Dosage is

regulated by monitoring the activated partial thromboplastin time (APTT), the international normalized ratio (INR), and the platelet count. Low-molecular-weight heparin (LMWH) is given in one or two injections daily; it is more expensive than unfractionated heparin but safer.

- Oral anticoagulants (eg, warfarin [Coumadin]) are given with heparin therapy.
- Fondaparinux given subcutaneously for prophylaxis during major orthopedic surgery (hip replacement, etc.).
- Thrombolytic (fibrinolytic) therapy (eg, alteplase) is given within the first 3 days after acute thrombosis.
- Throughout therapy, PTT, prothrombin time (PT), hemoglobin and hematocrit levels, platelet count, and fibrinogen level are monitored frequently. Drug therapy is discontinued if bleeding occurs and cannot be stopped.

Endovascular Management

Endovascular management is necessary for DVT when anticoagulant or thrombolytic therapy is contraindicated, the danger of pulmonary embolism is extreme, or venous drainage is so severely compromised that permanent damage to the extremity is likely. A thrombectomy may be necessary. A vena cava filter may be placed at the time of the thrombectomy.

Nursing Management

Assessing and Monitoring Anticoagulant Therapy

- To prevent inadvertent infusion of large volumes of unfractionated heparin, which could cause hemorrhage, administer unfractionated heparin by continuous IV infusion using an electronic infusion device.
- Dosage calculations are based on the patient's weight, and any possible bleeding tendencies are detected by a pretreatment clotting profile; if renal insufficiency exists, lower doses of heparin are required.
- Obtain periodic coagulation tests and hematocrit levels: Heparin is in the effective, or therapeutic, range when the APTT is 1.5 times the control.
- Monitor oral anticoagulants, such as warfarin, by the PT or the INR. Because the full anticoagulant effect of warfarin is delayed for 3 to 5 days, it is usually administered concurrently

with heparin until desired anticoagulation has been achieved (ie, when the PT is 1.5 to 2 times normal or the INR is 2.0 to 3.0).

Monitoring and Managing Potential Complications

- Assess for early signs of spontaneous bleeding (principal complication of anticoagulant therapy): bruises, nosebleeds, and bleeding gums; administer IV injections of protamine sulfate to reverse effects of heparin and LMWH (less effective), administer vitamin K and/or infusion of fresh-frozen plasma or prothrombin concentrate to reverse effects of warfarin.
- Monitor for heparin-induced thrombocytopenia by regularly monitoring platelet counts. Early signs include decreasing platelet count, the need for increasing doses of heparin to maintain the therapeutic level, and thromboembolic or hemorrhagic complications (appearance of skin necrosis, skin discoloration, purpura, and blistering). If thrombocytopenia does occur, perform platelet aggregation studies, discontinue heparin, and rapidly initiate alternate anticoagulant therapy.
- Closely monitor the medication schedule, because oral anticoagulants interact with many other medications and herbal and nutritional supplements.

Providing Comfort

- Elevate affected extremity and apply warm, moist packs to reduce discomfort.
- Encourage walking once anticoagulation therapy has been initiated (better than standing or sitting for long periods).
- Recommend bed exercises, such as dorsiflexion of the foot against a footboard.
- Provide additional pain relief with mild analgesic agents as prescribed.
- Initiate compression therapy as prescribed to help improve circulation and increase comfort: graduated compression stockings, external compression devices and wraps (eg, short stretch elastic wraps, Unna boot, CircAid), intermittent pneumatic compression devices.

NURSING ALERT

Elderly patients may be unable to apply elastic stockings properly. Teach the family member who is to assist the patient to apply the stockings so that they do not cause undue pressure on any part of the feet or legs.

- With compression therapy, assess patient for comfort, inspect skin under device for signs of irritation or tenderness, and ensure that prescribed pressures are not exceeded.

NURSING ALERT

Any type of stocking can inadvertently become a tourniquet if applied incorrectly (ie, rolled tightly at the top). In such instances, the stockings produce rather than prevent stasis. For ambulatory patients, graduated compression stockings are removed at night and reapplied before the legs are lowered from the bed to the floor in the morning.

Positioning the Body and Encouraging Exercise

- Elevate feet and lower legs periodically above heart level when on bed rest.
- Perform active and passive leg exercises, particularly those involving calf muscles, to increase venous flow preoperatively and postoperatively.
- Provide early ambulation to help prevent venous stasis.
- Encourage deep-breathing exercises because they produce increased negative pressure in the thorax, which assists in emptying the large veins.
- Once ambulatory, instruct the patient to avoid sitting for more than an hour at a time; encourage patient to walk at least 10 minutes every 1 to 2 hours.
- Instruct the patient to perform active and passive leg exercises as frequently as necessary when he or she cannot ambulate, such as during long car, bus, train, and plane trips.

Teaching Patients Self-Care

- Teaching the patient how to apply graduated compression stockings and explain the importance of elevating the legs and exercising adequately.

- Instruct patient on the purpose and importance of medication (correct dosage at specific times) and need for scheduled blood tests to regulate medications.

For more information, see Chapter 31 in Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical-surgical nursing* (12th ed.). Philadelphia: Lippincott Williams & Wilkins.

Appendix A

Selected Lab Values

Blood Chemistry

Test	Conventional Units	SI Units
Alanine aminotransferase (ALT, formerly SGPT	Males: 10–40 U/mL Females: 8–35 U/mL	Males: 0.17–0.68 μkat/L Females: 0.14–0.60 μkat/L
Alkaline phosphatase	50–120 U/L	50–120 U/L
Ammonia (plasma)	15–45 μg/dL (varies with method)	11–32 μmol/L
Amylase	60–160 Somogyi U/dL	111–296 U/L
Aspartase amino transferase (AST, formerly SGOT)	Males: 10–40 U/L Females: 15–30 U/L	Males: 0.34–0.68 μkat/L Females: 0.25–0.51 μkat/L
Bicarbonate	24–31 mEq/L	24–31 mmol/L
Bilirubin (total)	0.3–1.0 mg/dL	5–17 μmol/L
Direct	0.1–0.4 mg/dL	1.7–3.7 μmol/L
Indirect	0.1–0.4 mg/dL	3.4–11.2 μmol/L
Blood urea nitrogen (BUN)	8–20 mg/dL	2.9–7.1 mmol/L
Calcium	8.6–10.2 mg/dL	2.5–2.55 mmol/L
Carbon dioxide, arterial (whole blood) partial pressure ($PaCO_2$)	35–45 mm Hg	4.66–5.99 kPa
Chloride	97–107 mEq/L	97–107 mmol/L
Creatine kinase (CK) isoenzymes	32–267 U/L[†]	0.53–4.45 μkat/L[†]
Creatine kinase (MB)	<16 IU/L[†] or 4% of total CK	<0.27 μkat/L[†]
Creatinine (serum)	0.7–1.4 mg/dL[†]	64–124 μmol/L[‡]
Gamma-glutamyl-transpeptidase (GGT)	Males: 20–30 U/L Females: 1–24 U/L	0.03–0.5 μkat/L 0.02–0.4 μkat/L
Glucose (blood)	Fasting: 60–110 mg/dL	3.3–6.05 mmol/L
	Postprandial (2 h): 65–140 mg/dL	3.58–7.7 mmol/L
Glycosylated hemoglobin (HbA_{1c})	3.9%–6.9%	
Lactate dehydrogenase (LDH)	90–176 mU/mL	90–176 U/L
Lipids		
Cholesterol	<200 mg/dL (desirable)	<5.2 mmol/L
Triglycerides	<165 mg/dL	<1.65 g/L
Lipase	0–160 U/L[†]	0.266 μkat/L[†]
Magnesium	1.3–2.3 mg/dL	0.62–0.95 mmol/L

(continued)

Blood Chemistry *(Continued)*

Test	Conventional Units	SI Units
Osmolality	275–300 mOsm/kg	275–300 mmol/L
Phosphorus (inorganic)	2.5–4.5 mg/dL	0.8–1.45 mmol/L
Potassium	3.5–5.0 mEq/L	3.5–5.0 mmol/L
Prostate-specific antigen (PSA)	0–4 ng/mL	0–4 μg/L
Protein total	6.0–8.0 g/dL	60–80 g/L
Albumin	3.5–5.5 g/dL	40–55 g/L
Globulin	1.7–3.3 g/dL	17–33 g/L
A/G ratio	1.0–2.2	1.0–2.2
Thyroid Tests		
Thyroxine (T_4) total	5.0–11.0 μg/dL	65–138 mmol/L
Thyroxine, free (FT_4)	0.8–2.7 ng/dL	10.3–35 pmol/L
Triiodothyronine (T_3) total	70–204 ng/dL	1.08–3.14 nmol/L
Thyroid-stimulating hormone (TSH)	0.4–6.0 μU/mL	0.4–4.2 mIU/L
Thyroglobulin	3–42 ng/mL	3–42 μg/L
Sodium	135–145 mEq/L	135–145 mmol/L
Uric acid	2.5–8 mg/dL	0.15–0 mmol/L

U, units
†Laboratory and/or method specific
‡Varies with age and muscle mass

Hematology

Test	Conventional Units	SI Units
Erythrocyte count (RBC count)	Males: 4.2–5.4 × 10^6/μL Females: 3.6–5.0 × 10^6/μL	Males: 4.2–5.4 × 10^{12}/L Females: 3.6–5.0 × 10^{12}/L
Hematocrit (Hct)	Males: 40%–50% Females: 37%–47%	Males: 0.40–0.50 Females: 0.37–0.47
Hemoglobin (Hb)	Males: 14.0–16.5 g/dL Females: 12.0–15.0 g/dL	Males: 140–165 g/L Females: 120–150 g/L
Mean corpuscular hemoglobin (MHC)	27–34 pg/cell	0.40–0.53 fmol/cell
Mean corpuscular hemoglobin concentration (MCHC)	31–35 g/dL	310–350 g/L
Mean corpuscular volume (MCV)	80–100 fL	
Reticulocyte count	1.0%–1.5% total RBC	
Leukocyte count (WBC count)	4.4–11.3 × 10^3/μL	4.4–11.3 × 10^9/L
Basophils	0%–2%	
Eosinophils	0%–3%	
Lymphocytes	24%–40%	
Monocytes	4%–9%	
Neutrophils (segmented [Segs])	47%–63%	
Neutrophils (bands)	0%–4%	

Appendix B

NANDA-Approved Nursing Diagnoses 2007–2008

Activity Intolerance
Activity Intolerance, Risk for
Airway Clearance, Ineffective
Allergy Response, Latex
Allergy Response, Risk for Latex
Anxiety
Anxiety, Death
Aspiration, Risk for
Attachment, Risk for Impaired Parent/Child
Autonomic Dysreflexia
Autonomic Dysreflexia, Risk for
Behavior, Risk-Prone Health
Body Image, Disturbed
Body Temperature, Risk for Imbalanced
Bowel Incontinence
Breastfeeding, Effective
Breastfeeding, Ineffective
Breastfeeding, Interrupted
Breathing Pattern, Ineffective
Cardiac Output, Decreased
Caregiver Role Strain
Caregiver Role Strain, Risk for
Comfort, Readiness for Enhanced
Communication, Impaired Verbal
Communication, Readiness for Enhanced
Conflict, Decisional (Specify)
Conflict, Parental Role
Confusion, Acute
Confusion, Chronic
Confusion, Risk for Acute
Constipation
Constipation, Perceived
Constipation, Risk for
Contamination
Contamination, Risk for
Coping, Ineffective
Coping, Compromised Family
Coping, Defensive
Coping, Disabled Family
Coping, Ineffective
Coping, Ineffective Community
Coping, Readiness for Enhanced
Coping, Readiness for Enhanced Community

Coping, Readiness for Enhanced Family
Death Syndrome, Risk for Sudden Infant
Decision Making, Readiness for Enhanced
Denial, Ineffective
Dentition, Impaired
Development, Risk for Delayed
Diarrhea
Dignity, Risk for Compromised Human
Distress, Moral
Disuse Syndrome, Risk for
Diversional Activity, Deficient
Energy Field, Disturbed
Environmental Interpretation Syndrome, Impaired
Failure to Thrive, Adult
Falls, Risk for
Family Processes, Dysfunctional: Alcoholism
Family Processes, Interrupted
Family Processes, Readiness for Enhanced
Fatigue
Fear
Fluid Balance, Readiness for Enhanced
Fluid Volume, Deficient
Fluid Volume, Excess
Fluid Volume, Risk for Deficient
Fluid Volume, Risk for Imbalanced
Gas Exchange, Impaired
Glucose, Risk for Unstable Blood
Grieving, Anticipatory
Grieving, Complicated
Grieving, Risk for Complicated
Growth and Development, Delayed
Growth, Risk for Disproportionate
Health Maintenance, Ineffective
Health-Seeking Behaviors (Specify)
Home Maintenance, Impaired
Hope, Readiness for Enhanced
Hopelessness
Hyperthermia
Hypothermia
Identity, Disturbed Personal
Immunization Status, Readiness for Enhanced
Incontinence, Functional Urinary
Incontinence, Overflow Urinary
Incontinence, Reflex Urinary
Incontinence, Stress Urinary
Incontinence, Total Urinary
Incontinence, Urge Urinary
Incontinence, Risk for Urge Urinary
Infant Behavior, Disorganized
Infant Behavior, Risk for Disorganized
Infant Behavior, Readiness for Enhanced Organized

Infant Feeding Pattern, Ineffective
Infection, Risk for
Injury, Risk for
Injury, Risk for Perioperative Positioning
Insomnia
Intracranial Adaptive Capacity, Decreased
Knowledge, Deficient (Specify)
Knowledge, Readiness for Enhanced
Lifestyle, Sedentary
Liver Function, Risk for Impaired
Loneliness, Risk for
Memory, Impaired
Mobility, Impaired Bed
Mobility, Impaired Physical
Mobility, Impaired Wheelchair
Nausea
Neglect, Unilateral
Noncompliance
Nutrition, Imbalanced: Less Than Body Requirements
Nutrition, Imbalanced: More Than Body Requirements
Nutrition, Readiness for Enhanced
Nutrition, Risk for Imbalanced: More Than Body Requirements
Oral Mucous Membrane, Impaired
Pain, Acute
Pain, Chronic
Parenting, Readiness for Enhanced
Parenting, Impaired
Parenting, Risk for Impaired
Peripheral Neurovascular Dysfunction, Risk for
Poisoning, Risk for
Post-Trauma Syndrome
Post-Trauma Syndrome, Risk for
Power, Readiness for Enhanced
Powerlessness
Powerlessness, Risk for
Protection, Ineffective
Rape Trauma Syndrome
Rape Trauma Syndrome: Compound Reaction
Rape Trauma Syndrome: Silent Reaction
Religiosity, Impaired
Religiosity, Readiness for Enhanced
Religiosity, Risk for Impaired
Relocation Stress Syndrome
Relocation Stress Syndrome, Risk for
Role Performance, Ineffective
Self-Care, Readiness for Enhanced
Self-Care Deficit, Bathing/Hygiene
Self-Care Deficit, Dressing/Grooming
Self-Care Deficit, Feeding
Self-Care Deficit, Toileting
Self-Concept, Readiness for Enhanced
Self-Esteem, Chronic Low
Self-Esteem, Situational Low

Self-Esteem, Risk for Situational Low
Self-Mutilation
Self-Mutilation, Risk for
Sensory Perception, Disturbed (Specify: Visual, Auditory, Kinesthetic, Gustatory, Tactile, Olfactory)
Sexual Dysfunction
Sexuality Pattern, Ineffective
Skin Integrity, Impaired
Skin Integrity, Risk for Impaired
Sleep Deprivation
Sleep, Readiness for Enhanced
Social Interaction, Impaired
Social Isolation
Sorrow, Chronic
Spiritual Distress
Spiritual Distress, Risk for
Spiritual Well-Being, Readiness for Enhanced
Stress Overload
Suffocation, Risk for
Suicide, Risk for
Surgical Recovery, Delayed
Swallowing, Impaired
Therapeutic Regimen Management, Effective
Therapeutic Regimen Management, Ineffective
Therapeutic Regimen Management, Ineffective Community
Therapeutic Regimen Management, Ineffective Family
Therapeutic Regimen Management, Readiness for Enhanced
Thermoregulation, Ineffective
Thought Processes, Disturbed
Tissue Integrity, Impaired
Tissue Perfusion, Ineffective (Specify Type: Renal, Cerebral, Cardiopulmonary, Gastrointestinal, Peripheral)
Transfer Ability, Impaired
Trauma, Risk for
Urinary Elimination, Impaired
Urinary Elimination, Readiness for Enhanced
Urinary Retention
Ventilation, Impaired Spontaneous
Ventilatory Weaning Response, Dysfunctional
Violence, Risk for Other-Directed
Violence, Risk for Self-Directed
Walking, Impaired
Wandering

NANDA International. (2007). *Nursing diagnoses: Definitions & classification* 2007–2008. Philadelphia: Author.

Appendix C

Key Health Care Abbreviations and Acronyms

Note: These are examples and may differ slightly from facility to facility.

A

AAFP	American Academy of Family Physicians
AALPN	American Association of Licensed Practical Nurses
AAMI	age-associated memory impairment
AAP	American Academy of Pediatricians
AARP	American Association of Retired Persons
AB	abortion
Ab	antibody
ABCDE	airway and cervical spine, breathing, circulation, disability, exposure
ABG	arterial blood gas
ABP	acute bacterial prostatitis
AC	Adriamycin and Cytoxan
ACE	all-cotton elastic
ACE	angiotensin-converting enzyme
ACIP	Advisory Committee on Immunization Practices
ACLS	Advanced Cardiac Life Support
ACS	American Cancer Society; Ambulatory Care Sensitive
ACTH	adrenocorticotropic hormone
AD	advance directive
ADA	American Diabetes Association
ADAMHA	Alcohol, Drug Abuse, and Mental Health Administration
ADC	AIDS dementia complex
ADDH	attention deficit disorder with hyperactivity
ADH	antidiuretic hormone
ADHD	attention deficit hyperactivity disorder
ADL	activities of daily living
AEA	above-the-elbow amputation
AEB	as evidenced by
AED	automated external defibrillator
AFP	alpha-fetoprotein
Ag	antigen

AGA	appropriate for gestational age
AHA	American Hospital Association
AHCPR	Agency for Health Care Policy and Research
AI	adequate intake
AICD	automatic implantable cardioverter–defibrillator
AIDS	acquired immunodeficiency syndrome
AJN	*American Journal of Nursing*
AKA	above-the-knee amputation; also known as
ALL	acute lymphocytic leukemia
ALS	amyotrophic lateral sclerosis
ALT	alanineaspartate aminotransferase (formerly SGPOT)
AMA	American Medical Association; against medical advice
AML	acute myelogenous leukemia
ANA	American Nurses Association
ANCC	American Nurses Credentialing Center
ANP	atrial natriuretic peptide
ANS	autonomic nervous system
AP	apical pulse; anteroposterior; anterior-posterior (repair); assault precautions (attack)
APGAR	A = appearance (color); P = pulse (heart rate); G = grimace or reflexes (irritability); A = activity (muscle tone); R = respiratory effort
APHA	American Public Health Association
APIE	assessment, plan, intervention, evaluation
APTT	activated partial thromboplastin time
A-R	apical–radial (pulse)
ARC	American Red Cross
ARDD	alcohol-related developmental disability
ARDS	adult acute respiratory distress syndrome
ARND	alcohol-related neurodevelopmental disorder
AROM	active range of motion; artificial rupture of the membranes
ARRP	anatomic retropubic radical prostatectomy
ART	Accredited Record Technician
AS	sickle cell trait
ASA	acetylsalicylic acid (aspirin)
ASD	atrial septal defect; autism spectrum disorders
ASO	antistreptolysin O titer
AST	aspartate aminotransferase
ASU	Ambulatory Surgery Unit
ATF	Alcohol, Tobacco, and Firearms
ATLS	Advanced Trauma Life Support
ATN	acute tubular necrosis
ATP	adenosine triphosphate
AV	atrioventricular
AVPU	Alert, Verbal, Pain response, Unresponsive
AWOL	absent without leave
Ax	axillary

B

BAL in Oil	dimercaprol
BBB	blood–brain barrier
BBP	blood-borne pathogens
BCG	bacille Calmette–Guérin
BCLS	Basic Cardiac Life Support
BCP	birth control pill
BE	barium enema x-ray
BEA	below-the-elbow amputation
BIDS	bedtime insulin and daytime sulfonylureas
BKA	below-the-knee amputation
BLL	blood lead level
BLS	Basic Life Support
BM	bowel movement
BMI	body mass Index
BMT	bone marrow transplantation
BOA	born out of asepsis
BOH	Board of Health
BP	blood pressure
BPAD	bipolar affective disorder
BPD	bipolar disorder
BPH	benign prostatic hyperplasia
BPM	beats per minute
BPRS	Brief Psychiatric Rating Scale
BRAT	bananas, rice, applesauce, toast
BRM	biologic response modifiers
BRP	bathroom privileges
BS	bowel sounds
BSC	bedside commode
BSE	breast self-examination
BUN	blood urea nitrogen

C

C	Celsius; centigrade
C & S	(blood) culture and sensitivity
C2, C3, etc.	cervical section of the spinal cord
Ca^{++}	calcium
$Ca_3[PO_4]_2$	calcium phosphate
CABG	coronary artery bypass grafting
$CaCl_2$	calcium chloride
$CaCO_3$	calcium carbonate
CAD	coronary artery disease
CAF	Cytoxan, Adriamycin, fluorouracil
CAPD	continuous ambulatory peritoneal dialysis
CAT	computerized adaptive testing
CBC	complete blood cell
CBE	charting by exception

CBP	chronic bacterial prostatitis
cc	cubic centimeter
CC	chief complaint
CCP	clinical care pathway
CCU	coronary care unit
CCU/CICU	coronary care unit/coronary intensive care unit
CD	chemical dependency
CD4	helper T lymphocytes
CDC	Centers for Disease Control and Prevention
CDU	chemical dependency unit, clinical decision unit
CEA	carcinoembryonic antigen; cultured epithelial autografts
CEH	continuing education hour
CEU	continuing education unit
CF	cystic fibrosis
CHAP	Community Health Accreditation Program
CHC	community health center
CHD	coronary heart disease
CHF	congestive heart failure
CHHA	Certified Home Health Aide
CHO	carbohydrates
CIC	crisis intervention center
CICU	coronary intensive care unit
CK	creatine kinase
Cl	chloride
CLL	chronic lymphocytic leukemia
CLTC	Citizens for Long-Term Care
CM	case/care manager
CMF	Cytoxan, methotrexate, fluorouracil
CMG	cystometrogram
CML	chronic myelogenous leukemia
CMMS	Centers for Medicare and Medicaid Services
CMS	color, motion, sensitivity (circulation, mobility, sensation)
CMV	cytomegalovirus
CNM	Certified Nurse Midwife
CNO	Community Nursing Organization
CNS	central nervous system
CO	cardiac output
CO_2	carbon dioxide
COA	children of alcoholics; coarctation of the aorta
COAs	children of alcoholics
COLD	chronic obstructive lung disease
COPD	chronic obstructive pulmonary disease
COPs	Conditions of Participation (Medicare requirements)
COTA	Certified Occupational Therapy Assistant
CP	cardiopulmonary; cerebral palsy
CPAP	continuous positive airway pressure
CPD	cephalopelvic disproportion

CPK	creatine phosphokinase
CPM	continuous passive motion
CPR	cardiopulmonary resuscitation
CPT	chest physiotherapy
CQI	contiguous (or continuous) quality improvement
CRH	corticotropin-releasing hormone
CRNA	Certified Registered Nurse Anesthetist
CRNH	Certified Registered Nurse—Hospice
CRP	C-reactive protein
CRU	Coronary Rehabilitation Unit
Cryo	cryoprecipitate
CS	complete stroke; cardiac sphincter
CSF	cerebral ospinal fluid; colony-stimulating factors
CSR, CSS	Central Supply Room, Central Service Supply
CT	computed tomography
CUC	chronic ulcerative colitis
CVA	cerebrovascular accident
CVP	central venous pressure
CVS	chorionic villus sampling
CXR	chest x-ray

D

D & C	dilatation and curettage
D/2NS5%	dextrose in half-normal saline (0.45% NS)
D/C	discontinue
D5NS5%	dextrose in normal saline (0.9% NS)
D5W5%	dextrose in sterile water
DAPE	data, assessment, plan, evaluation
DARE	data, action, response, education
DAT	diet as tolerated
Db	decibel
DBP; dBP	diastolic blood pressure
DCH	District Court hold
DCT	distal convoluted tubule
DDST	Denver Developmental Screening Test
DEA	Drug Enforcement Agency
DEP	Department of Environmental Protection
DERM	dermatology
DES	diethylstilbestrol
DIC	disseminated intravascular coagulation
DISCUS	Dyskinesia Identification System-Condensed User Scale
DJD	degenerative joint disease
DKA	diabetic ketoacidosis
dL	deciliter
DMAT	Disaster Medical Assistance Team
DMD	Duchenne muscular dystrophy
DME	Durable Medical Equipment

DMSA	2, 3-dimercaptosuccinic acid
DNA	deoxyribonucleic acid
DNH	do not hospitalize
DNI	do not intubate
DNR	do not resuscitate
DOA	Department of Agriculture
DOH	Department of Health
DOL	Department of Labor
DRF	drip rate factor
DRG	diagnosis-related group
DRI	dietary reference intake
DSM-IV	*Diagnostic and Statistical Manual of Mental Disorders, Revision IV*
DT	diphtheria and tetanus toxoids
DTAD	drain tube attachment device
DtaP	diphtheria, tetanus, acellular pertussis
DTP	diphtheria and tetanus toxoids and pertussis vaccine
DVR	Division of Vocational Rehabilitation
DVT	deep vein thrombosis

E

EAR	estimated average requirement
EC	emergency contraception
ECF	extended care facility; extracellular fluid
ECG (EKG)	electrocardiogram
ECT	electroconvulsive therapy
ED	emergency department; erectile dysfunction
EDC	estimated date of confinement
EDD	estimated date of delivery
EDTA	edetate calcium disodium
EEG	electroencephalogram
EGD	esophagogastroduodenoscopy
EHS	Employee Health Service
e-IPV	enhanced potency inactivated poliovirus vaccine
ELISA	enzyme-linked immunosorbent assay
EMB	ethambutol
EMG	electromyogram
EMS	Emergency Medical Services
EMT	Emergency Medical Technician
ENG	electronystagmography
EP	escape (elopement) precautions
EPA	Environmental Protection Agency
EPO	erythropoietin
EPS	electrophysiology study
EPSE	extrapyramidal side effects
ERCP	endoscopic retrograde cholangiopancreatography
ERG	electroretinogram
ERT	estrogen replacement therapy

ERV	expiratory reserve volume
ESR	erythrocyte sedimentation rate
ESRD	end-stage renal disease
ESWL	extracorporeal shock wave lithotripsy
ET	enterostomal therapist
ETOH	ethanol (alcohol)
ETOH W/D	alcohol withdrawal

F

F	Fahrenheit
FADL	functional activities of daily living
FAM	fertility awareness method
FAS	fetal alcohol syndrome
FBP	fetal biophysical profile
FBS	fasting blood sugar (fasting blood glucose)
FDA	Food and Drug Administration
Fe^{++}	iron
FES	functional electrical stimulation
FFP	fresh-frozen plasma
FHC	family health center
FHR	fetal heart rate
FHT	fetal heart tones
FPG	fasting plasma glucose
FQHC	Federally Qualified Healthcare
FRC	functional residual capacity
FRV	functional residue volume
FSH	follicle-stimulating hormone
FTT	failure to thrive
5-FU	5-fluorouracil
FVD	fluid volume deficit
FVE	fluid volume excess

G

G	gauge
GABHS	group A beta-hemolytic streptococcus
GCS	Glasgow Coma Scale
GDM	gestational diabetes mellitus
GERD	gastroesophageal reflux disease
GERI	geriatrics
GFR	glomerular filtration rate
GH	growth hormone
GHIH	growth hormone–inhibiting hormone
GI	gastrointestinal
GI tract	gastrointestinal tract
GnRH	gonadotropin-releasing hormone
G_6PD	glucose 6-phosphodehydrogenase
GRH, GHRH	growth hormone–releasing hormone

GTT	glucose tolerance test
G-Tube	gastrostomy (tube)
GU	genitourinary
GYN	gynecology

H

H^+	hydrogen ion
H flu	*Haemophilus influenzae*
H_2CO_3	carbonic acid
H_2O, HOH	water
HAS	Health Services Administration
HAV	hepatitis A virus
HAZMAT	hazardous materials
Hb A_{1c}	glycosylated hemoglobin
HBD	hydroxybutyric dehydrogenase
HBO	hyperbaric oxygenation
HBV	hepatitis B virus
HCA	Health Care Assistant
HCFA	Health Care Financing Association (payor source)
HCG	human chorionic gonadotropin
HCl	hydrochloric acid
HCO_3^-	bicarbonate
Hct	hematocrit
HCTZ	hydrochlorothiazide
HCV	hepatitis C virus
HD	Hodgkin's disease; Huntington's disease
HDL	high-density lipoprotein
HDV	hepatitis D virus
HEV	hepatitis E virus
HFCS	high-fructose corn syrup
Hgb; Hb	hemoglobin
HGF	hematopoietic factor
HGV	hepatitis G virus
HHA	Home Health Aide
HHRG	Home Health Resource Group
HHS	Department of Health and Human Services
HI	homicidal ideation
Hib	*Haemophilus influenzae type* B conjugate vaccine
HICPAC	Hospital Infection Control Practices Advisory Committee
HIS	Indian Health Service
HIV	human immunodeficiency virus
HIV-RNA	viral load of HIV
HMO	health maintenance organization
HNP	herniated nucleus pulposus
HOSA	Health Occupations Students of America
hPL	human placental lactogen
HPO_4^-, $H_2PO_4^-$	phosphate

HPV	human papillomavirus
HR	heart rate
HRT	hormone replacement therapy
HS	hour of sleep
HSV-1	herpes simplex virus type 1
HSV-2	herpes simplex virus type 2
HTN	hypertension
HUS	hemolytic uremic syndrome

I

IADL	instrumental activities of daily living
IBD	inflammatory bowel disease
IBS	irritable bowel syndrome
IBW	ideal body weight
IC	interstitial cystitis; inspiratory capacity
ICD	implantable cardioverter–defibrillator
ICF	intermediate care facility
ICN	International Council of Nurses
ICP	intracranial pressure
↑ICP	increased intracranial pressure
ICSH	interstitial cell-stimulating hormone
ICU	intensive care unit
ID	identification
IDDM	insulin-dependent diabetes mellitus
IDG	interdisciplinary group
IDT	interdisciplinary team
IFG	impaired fasting glucose
IFN	interferon
IG	immune globulins
Ig	immunoglobulin
IgE	immunoglobulin E
IgG	gamma immunoglobulin (gamma globulin)
IGH	impaired glucose homeostasis
IGT	impaired glucose tolerance
II	intellectual impairment
IICP	increased intracranial pressure
IL	interleukin
InFeD	iron dextran
INH	isoniazid
I & O	intake and output
IOL	intraocular lens
IOL implant	intraocular lens implant
IOP	intraocular pressure
IPPB	intermittent positive-pressure breathing
IQ	intelligence quotient
IR	infrared (rays)
IRV	inspiratory reserve volume

ITP	idiopathic thrombocytopenic purpura
IUD	intrauterine device
IV	intravenous
IVC	inferior vena cava
IVD	intervertebral disk disease
IVF	in vitro fertilization
IVIG	intravenous immune globulin
IVP	intravenous pyelogram
IVPB	intravenous piggyback

J

J tube	jejunostomy tube
JCAHO	Joint Commission on Accreditation of Healthcare Organizations
JGA, JG apparatus	juxtaglomerular apparatus
JP	Jackson Pratt (drains)
JRA	juvenile rheumatoid arthritis

K

K^+	potassium
Kkcal; C	kilocalorie
KCl	potassium chloride
KOH	potassium hydroxide
KUB	kidney–ureters–bladder x-ray

L

L1, L2, etc.	level of lumbar area of the spinal cord
LAD	left anterior descending
LASIK	laser-assisted in situ keratomileusis
LATCH	L = latch; A = audible swallowing; T = type of nipple; C = comfort (breast/nipple); H = hold (positioning)
LBW	low birthweight
LCA	left coronary artery
LCX	left circumflex
LDH	lactic dehydrogenase
LDL	low-density lipoprotein
LDRP	labor/delivery/recovery/postpartum room
LEEP	loop electrosurgical excision procedure
LEP	laparoscopic extraperitoneal approach
LES	lower esophageal sphincter
LFT	liver function tests
LGA	large for gestational age
LH	luteinizing hormone
LLQ	left lower quadrant
LMCA	left main coronary artery
LMP	last menstrual period
LNMP	last normal menstrual period
LOC	level of consciousness

LP	lumbar puncture
LPM, L/min	liters per minute
LPN/LVN	Licensed Practical Nurse/Licensed Vocational Nurse
LQR/LSR	locked quiet room, locked seclusion room
LS ratio	lecithin–sphingomyelin ratio
LSD	lysergic acid diethylamide
LT	leukotriene
LTB	laryngotracheobronchitis
LTC	long-term care
LUQ	left upper quadrant

M

MABP	mean arterial blood pressure
MAC	*Mycobacterium avium complex*
MAP	mean arterial pressure
MAR	Medication Administration Record
MAST	military antishock trousers
MCHB	Maternal Child Health Bureau
MD	muscular dystrophy
MDD	major depressive disorder
MDI	metered-dose inhaler
MDS	Minimum Data Set
mEq	milliequivalents
mEq/L	milliequivalents per liter
Mg; Mg^{++}	magnesium
MG	myasthenia gravis
mg/dL	milligrams per deciliter
$MgSO_4$	magnesium sulfate
MH, MHU	Mental Health Unit
MI & D	mentally ill and dangerous
MI	mental illness; myocardial infarction
MI-CD	mentally ill and chemically dependent
MICU	medical intensive care unit
MIF	melanocyte-inhibiting factor
MIS	Management Information Services/Systems
mL	milliliters
MMI	methimazole
MMPI	Minnesota Multiphasic Personality Inventory
MMR	measles, mumps, and rubella
MOM	milk of magnesia
MPD	multiple personality disorder
MRI	magnetic resonance imaging
MRSA	methicillin-resistant *Staphylococcus aureus*
MS	morphine sulfate; multiple sclerosis
MSAFP; MS-AFP	maternal serum alpha-fetoprotein test
MSDS	Material Safety Data Sheet
MSH	melanocyte-stimulating hormone

MSW	Medical Social Worker
MUA	medically underserved area
MVA	motor vehicle accident

N

Na^+	sodium
NACHC	National Association of Community Health Centers
NaCl	sodium chloride
NAHC	National Association for Home Care
NAHCC	National Association of Health Care Centers
NANDA	North American Nursing Diagnosis Association
NaOH	sodium hydroxide
NAPNES	National Association of Practical Nurse Education and Services
Na_2SO_4	sodium sulfate
NCHS	National Center for Health Statistics
NCI	National Cancer Institute
NCLEX	National Council Licensure Examination
NCLEX-PN	National Council Licensure Examination for Practical Nurses
NCLEX-RN	National Council Licensure Examination for Registered Nurses
NCP	nursing care plan
NCSBN	National Council of State Boards of Nursing
NEC	necrotizing enterocolitis
NEURO	neurology
NF	National Formulary
NFLPN	National Federation of Licensed Practical Nurses
NG	nasogastric
NG tube	nasogastric tube
NHIC	National Health Information Center
NHL	non-Hodgkin's lymphoma
NHO	National Hospice Organization
NHP	nursing home placement
NHPCO	National Hospice and Palliative Care Organization
NICU	neonatal intensive care unit
NIDDM	non–insulin-dependent diabetes mellitus
NIH	National Institute of Health
NINR	National Institute of Nursing Research
NIOSH	National Institute of Occupational Safety and Health
NLN	National League for Nursing
NMR	nuclear magnetic resonance
NMS	neuroleptic malignant syndrome
NOS	not otherwise specified
NP	nurse practitioner
NPO	nothing by mouth (*non per os*)
NPT	nocturnal penile tumescence
NRM	non-rebreathing mask
NS	normal saline or 0.9% sodium chloride
NSAID	nonsteroidal anti-inflammatory drug

NSC National Safety Council
NST nonstress test
NTG nitroglycerine

O

O_2 oxygen
OA osteoarthritis
OASIS Outcome and Assessment Information Set
OB obstetrics
OB/GYN obstetrician/gynecologist
OBRA Omnibus Budget Reconciliation Act
OBS/OBD organic brain syndrome/organic brain disorder
OBT over-bed table
OCD obsessive-compulsive disorder
OCT oxytocin challenge test
OD overdose; right eye (oculus dexter)
OFC occipital-frontal circumference
OH^- hydroxyl ion
OMH Office for Migrant Health
ONS Oncology Nursing Society
OOB out of bed
OP occiput posterior
O & P ova (eggs) and parasites
OPD outpatient department
OPHS Office of Public Health and Science
OPV (live) oral poliovirus vaccine
OR operating room
ORIF open reduction and internal fixation
ORS oral rehydration solution
ORTHO orthopedics
OS left eye (oculus sinister)
O_2 Sat percent oxygen saturation
OSHA Occupational Safety and Health Administration
OT occupational therapy
OTC over-the-counter
OTR Occupational Therapist, Registered
OU both eyes (oculi unitas)

P

P phosphorus
PA Physician Assistant
PACE Pre-Admission and Classification Examination
$PaCO_2$; pCO_2 carbon dioxide content of arterial blood
PACU postanesthesia care unit
PaO_2; pO_2 oxygen content of arterial blood
Pap test Papanicolaou test (smear)
PAR postanesthesia recovery (room)

PBI	protein-bound iodine
PBSC	peripheral blood stem cell
PCA	patient-controlled analgesia; personal care attendant
PCM	protein-calorie malnutrition
PCN	penicillin
PCP	*Pneumocystis carinii* pneumonia; primary care provider
PCT	proximal convoluted tubule
PDA	patent ductus arteriosus; posterior descending artery
PDR	Physician's Desk Reference
PE	polyethylene (tube)
PEDS	pediatrics
PEG	percutaneous endoscopic gastrostomy
PEP	postexposure prophylaxis
PERRLA + C	pupils equal, round, react to light, accommodation OK and coordinated
PET	position emission tomography
PFT	pulmonary function test
pH	potential of hydrogen; power of hydrogen (hydrogen ion concentration)
PIA	prolonged infantile apnea
PIC	peripheral indwelling catheter
PICC	peripherally inserted central catheter
PICU	pediatric intensive care unit
PID	pelvic inflammatory disease
PIE	plan, intervention, evaluation
PIH	pregnancy-induced hypertension; prolactin-inhibiting hormone
PKU	phenylketonuria
PM&R	physical medicine and rehabilitation
PMI	point of maximal impulse
PMP	previous menstrual period
PMS	premenstrual syndrome
PNS	peripheral nervous system
PO	by mouth (*per os*)
POC	plan of care
POS	point of service
PPD	purified protein derivative
PPE	personal protective equipment
PPF	plasma protein fraction
PPG	postprandial glucose
PPIP	Put Prevention Into Practice
2hPP	2-hour postprandial
PPN	peripheral parenteral nutrition
PPO	preferred provider organization
PPROM	prolonged premature rupture of membranes
PPS	prospective payment system
PRH	prolactin-releasing hormone
PRK	photorefractive keratotomy
PRL	prolactin
PRM	partial-rebreathing mask

PRN	as needed
PROM	passive range of motion; premature rupture of membranes
PR/R	per rectum/rectal
PSA	prostate-specific antigen
PSDA	Patient Self-Determination Act
psi	per square inch
PSV	pressure support ventilation
PSYCH	psychiatry
PT	prothrombin time; physical therapy
PTA	Physical Therapist Assistant
PTCA	percutaneous transluminal coronary angioplasty
PTH	parathyroid hormone, parathormone
PTL	preterm labor
PTSD	posttraumatic stress disorder
PTT	partial thromboplastin time
PTU	propylthiouracil
PUBS	percutaneous umbilical blood sampling
PUS	prostate ultrasound
PVC	premature ventricular contraction
PZA	pyrazinamide

Q

QA	quality assurance
QI	quality improvement

R

RA	rheumatoid arthritis
RAA system	renin–angiotensin–aldosterone system
RACE	rescue, alarm, confine, extinguish
RAI	radioactive iodine
RAIU	radioactive iodine uptake
RAP	resident assessment protocol
RBC	red blood cell
RCA	right coronary artery
RDA	recommended dietary allowance
RDS	respiratory distress syndrome
REE	resting energy expenditure
REHAB	rehabilitation unit
REM	rapid eye movement
RF	rheumatoid factor
RGP	rigid gas-permeable plastic
Rh^+	Rh positive
Rh^-	Rh negative
RhoGAM	Rh immune globulin
RICE	rest, ice, compression, elevation
RIE	recorded in error
RIND	reversible ischemic neurologic deficit

RK	radial keratotomy
RLQ	right lower quadrant
RMP	rifampin
RN	registered nurse
RNA	ribonucleic acid
ROI	release of information
ROM	range of motion
ROP	retinopathy of prematurity; right occiput posterior
RP	retinitis pigmentosa
RPh	registered pharmacist
RPT	registered physical therapist
RR	recovery room
RRA	registered record administrator
RSV	respiratory syncytial virus
RT	respiratory therapy
R/T	related to
RUG	resource utilization group
RUQ	right upper quadrant
RV	residual volume

S

S_1	first heart sound
S_2	second heart sound
S/A	suicide attempt
SA node	sinoatrial node; sinus node
SBE	subacute bacterial endocarditis
SBFT	small bowel follow-through x-ray
SBP; sBP	systolic blood pressure
SDSU	same-day surgery unit
S/G	suicide gesture
SGA	small for gestational age
SGOT	serum glutamic oxaloacetic transaminase
SI	suicidal ideation
SI units	International system of units (or Systeme International d'Unites)
SIADH	syndrome of inappropriate antidiuretic hormone
SIB	self-injurious behavior
SICU	surgical intensive care unit
SIDS	sudden infant death syndrome
SIE	stroke in evolution
SIMV	synchronized intermittent mandatory ventilation
SIRES	stabilize, identify toxin, reverse effect, eliminate toxin, support
SL	sublingual
SLD	specific learning disabilities
SLE	systemic lupus erythematosus
S/M	sadomasochism
SMBG	self-monitoring of blood glucose
SNF	skilled nursing facility

SNS	sympathetic nervous system
SO	significant other
SO_4^-	sulfate
SOAP	subjective, objective, assessment, plan
SOAPIER	subjective, objective, assessment, plan, intervention, evaluation, response
SOB	short of breath
SOBOE	short of breath on exertion
SP	suprapubic (catheter)
SP/GP	suicide precautions/general precautions
SPF	sun protective factor
SRO	single room occupancy
SROM	spontaneous rupture of the membranes
SSA	Social Security Administration
SSDI	Social Security Disability Insurance
SSE	soap suds enema
START	Simple Triage and Rapid Treatment
STAT	at once, immediately
STD	sexually transmitted disease
STH	somatotropic hormone (somatotropin)
STI	sexually transmitted infection
SV	stroke volume
SVC	superior vena cava
SVE	sterile vaginal examination
SVR	systemic vascular resistance
SX P	sexual precautions
SZ P	seizure precautions

T

T1, T2, etc.	level of injury in the thoracic area of the spinal cord
T_3	triiodothyronine
T_4	thyroxine
T&A	tonsillectomy and adenoidectomy
TAC	time, amount, character
TB	tuberculosis
TBI	traumatic brain injury
TBW	total body water
TCDB	turning, coughing, deep breathing
TCN	tetracycline
TD	tardive dyskinesia
TED	thromboembolic disease
TEE	transesophageal echocardiography
TENS	transcutaneous electrical nerve stimulation
TFT	thyroid function test
TGV	transposition of the great vessels
THA	total hip arthroplasty
THC	cannabis (marijuana and related drugs)
T-hold	transportation hold (police)

TIA	transient ischemic attack
TICU	trauma intensive care unit
Title XVIII	Medicare section of the Social Security Act
Title XIX	Medicaid section of the Social Security Act
Title XXII	source of COPs
TKA	total knee arthroplasty
TLC	total lung capacity
TLSO	thoracolumbar sacroorthosis
Tm	transport maximum
TMJ	temporal mandibular joint
TMR	transmyocardial revascularization
TO	telephone order
TOF	tetralogy of Fallot
TORCH	toxoplasmosis, other, rubella, cytomegalovirus, herpes simplex
t-PA	tissue plasminogen activator
TPA	total parenteral alimentation
TPN	total parenteral nutrition
TPR	temperature, pulse, and respiration
TR	therapeutic recreation
TS	Tourette syndrome
TSE	testicular self-examination
TSH	thyroid-stimulating hormone
TSLO	thoracic-lumbar-sacral orthosis
TSS	toxic shock syndrome
TURBT	transurethral resection of bladder tumor
TURP	transurethral resection of prostate
TV	tidal volume
TWE	tap water enema
T&X	type and crossmatch

U

U-100	100 units per milliliter
UA	urinalysis
UAP	unlicensed assistive personnel
UL	tolerance upper intake level
UN	United Nations
UNICEF	United Nations Children's Fund
UNOS	United Network of Organ Sharing
UPP	urethral pressure profile
UPT	urine pregnancy test
URI	upper respiratory infection
UROL	urology
US	ultrasound
USD	U.S. Dispensatory
USDA	U.S. Department of Agriculture
USDHHS	U.S. Department of Health and Human Services
USP	U.S. Pharmacopoeia

USPHS	U.S. Public Health Service
UTI	urinary tract infection
UTox	urine toxicity screen (for drugs)
UV	ultraviolet (rays)

V

VC	vital capacity
VCUG	voiding cystourethrogram
VLBW	very low birthweight
VMA	vanillylmandelic acid
VNA	Visiting Nurse Association
VO	verbal order
Vol	voluntarily admitted
VRE	vancomycin-resistant enterococci
V & S; vol. and spec.	volume and specific gravity (urine)
VSD	ventricular septal defect

W

WA	while awake
WBC	white blood cell
W/C	wheelchair
WHO	World Health Organization
WIC	Women, Infants and Children
WISC-R	Wechsler Intelligence Scale for Children—Revised
WNL	within normal limits

Index

F

G

T

U

X

Z